# ELECTRICAL TIMES

THURSDAY
27 APRIL
1950
SIXPENCE



MAZDA

the outshining light

NEW!

**MAZDA SILVERLIGHT LAMPS**

**bring luxury lighting to every home!**

★ Better Seeing ★ Softer Lighting ★ Perfect Diffusion ★ Greater Comfort

Fit MAZDA SILVERLIGHT Coiled Coil Lamps in home, office, store, etc., and get full value and beauty from your lighting.

100 watt lamp **2/7** inc. P.T. *Send your order today!*

**MAZDA LAMPS AND LIGHTING EQUIPMENT**

*Made in England by* B T-H *Leaders in Lighting*

The British Thomson-Houston Co. Ltd., Crown House, Aldwych, London, W.C.2. Tel: TEMple Bar 8040

4267

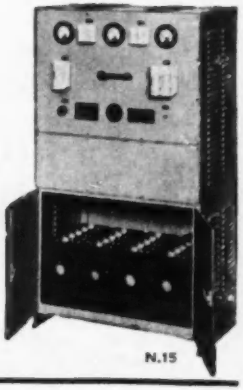
The papers say we shan't want electricity much longer. We shall have these new atoms instead. But the people here can't have read the papers. They still go on making this Crompton cable as if it had got to last for ever. I ask you—where's the sense in it?

**Crompton PAPER CABLES**

CROMPTON PARKINSON LTD., CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2

## AS DEPENDABLE AS DAYBREAK

When you have a Nife-Neverfayle emergency lighting equipment you need never fear a sudden disastrous black-out. For the NIFE battery is absolutely dependable. However long it stands idle, it is ready to give its full voltage the instant that the mains fail because there is no self-discharge. A NIFE battery is made principally of steel and so is chemically and physically almost indestructible. To this inherent reliability is added very low maintenance costs. No wonder hospitals and cinemas all over the world are using Nife-Neverfayle as their emergency lighting equipment.




# NIFE-NEVERFAYLE

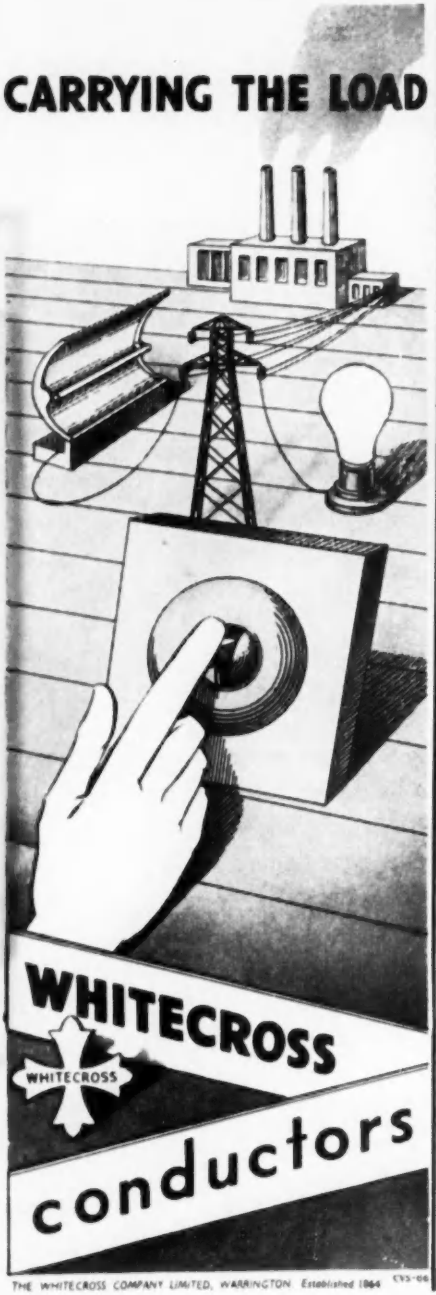
**THE EMERGENCY LIGHTING EQUIPMENT**

***with the STEEL battery***

NIFE BATTERIES · REDDITCH · WORCESTERSHIRE

A

# CARRYING THE LOAD



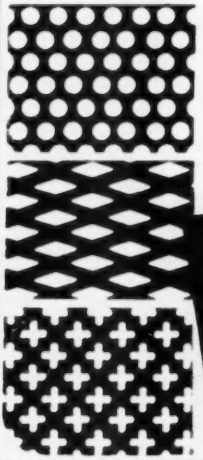
WHITECROSS

WHITECROSS

conductors

THE WHITECROSS COMPANY LIMITED, WARRINGTON. Established 1864 CVS-06

# PERFORATED METAL . . .



for Covers and Panels on Electrical Machinery, Equipment and Motors

ASH and LACY Ltd

MERIDEN ST · BIRMINGHAM 5

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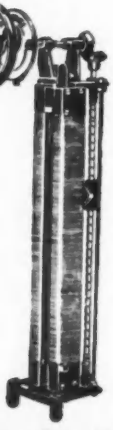
# SLIDING RESISTANCES

*for all purposes*



At a price you will approve, CRESSALL can supply you with a Sliding Resistance of the type and size to meet your particular requirements. Make a point of getting in touch with us soon.

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registered Trade Name of—

The CRESSALL MANUFACTURING CO. LTD.

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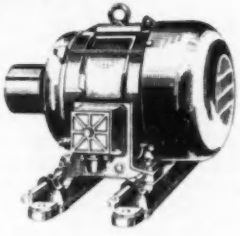
BUT QUALITY IS STILL IMPROVING AS A RESULT OF CONTINUED RESEARCH.

ASK BROOK TO QUOTE FOR YOUR ELECTRIC MOTORS.



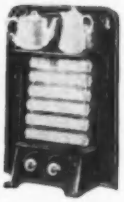
BROOK MOTORS Ltd

HUDDERSFIELD • ENGLAND

I.HS. 164

1912

1950



*The story of* **BELLING** *& Company Ltd.* No. 3

This chapter will deal with the very start of Belling & Co. Ltd., in 1912.

I must tell you first of all that I was apprenticed to Crompton & Co. Ltd., Chelmsford for three years and then had two years on their staff. I left them to join Ediswans at Ponders End as Superintendent of three of their Departments. Arc Lamps, Auto-transformers, Bastian Electric Heaters. After about three years here I began to seriously think of starting in business on my own account and finally decided to take the plunge. The late Mr. Hunter, who was Works Manager, was very nice about it but told me that before leaving I had to find and train someone to take over my job. This took a few months and during this time I was able to think matters over. What to make, where to get premises and how to get the necessary capital were, of course, the main problems. Having had experience in making electric heaters I decided to carry on in this field. With regard to premises I was lucky in finding a small garage at Enfield. As to capital, I had £150; Mr. C. L. Arnold with whom I had been in "digs" whilst at Cromptons, joined in with £150; and a mutual friend, Mr. H. E. How came in with the same amount, and that £450 is what we started with.

Well, my job at Ediswans came to an end in due course and I value very much a little presentation they made to me on leaving. Also the Works Manager kindly let me take a fitter (Mr. Tookey) from the "Brass Shop", and he eventually became our Works Manager. We took on a local boy and started off one Monday morning in August 1912 in the empty garage. The fitter and the boy commenced making benches and stools, fitting up a few vices, drills and other small assembling appliances.

I was working on the new fire I had in mind. The Bastian Heater of that day, as many will remember, consisted of a resistance spiral inside a quartz tube. I wanted something entirely different, simpler and stronger. I was very fortunate in hitting on the simple idea of winding a resistance wire on the front face of a strip of fireclay. After making several models in soapstone I eventually produced a strip with two serrated edges and a bridge in the centre, which meant the wire was working at a red temperature in free air and the heat from it was thrown forward. This was my first patent taken out in 1912 and was most successful. I think it was the first firebar of its type ever made and broadly speaking, revolutionised the electric fire of that day. Besides Bastian Heaters most others were "sausage" lamps or purely "convectors". The next step was, of course, to design a frame into which to fit the bars. In actual fact I drew out a very simple flat type of frame with a couple of drop ornaments, in blue pencil on a sheet of a "Daily Mail". It had many good points, however, one of which was that the frame was high and wide enough to cover up the normal fireplace. There was a fender at the bottom to carry two switches and it also carried a ruby lamp which lit up the fire generally, through a sheet of muranese glass. Above the fender were six firebars on a slight slope and above the bars, a trivet which could be let down for boiling.

Next time tells of a beginner's production troubles and then how the fires "sold like hot cakes".

C. A. Belling

*Belling & Co. Ltd., Bridge Works, Enfield, Middx. Tel: Howard 1212*

Do your circuits operate in high temperatures? Do you face continuous renewal of cables and wires that have had the life baked out of them?

For "hot-spots" like these, B.I.C.C. can now provide Silicone Rubber Insulated Cables and Flexibles. Silicone Rubber is designed to provide reliable, stable insulation in unusually high temperatures. It remains flexible and does not bake, crack or flow. Silicone rubber insulating tubing can also be offered.

Investigate these new cables and see if they solve your problems. Enquiries for special applications are sought and welcomed. When writing, please give complete data on installation, condition of service, voltage and current loading. Your nearest B.I.C.C. office will be pleased to deal with your enquiry.

## Application

Boiler gauge light connections. Thermo-couple leads. Connections for rheostats, furnaces, flue motors, electric ranges, stoves, electronic equipment and commercial radio apparatus. Turbo-jet engine leads. Film projector connections. Insulating sleeves for radio.

*Write for Publication No. 261W.*

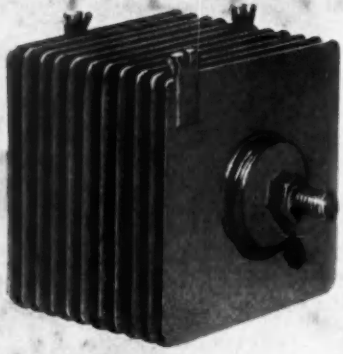
B.I. Callender's

**SILICONE RUBBER INSULATED CABLES**

BRITISH INSULATED CALLENDER'S CABLES LIMITED
NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2

B

# A background of 25 YEARS



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*See the latest developments on*

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## RECTIFIERS

have behind them the accumulated experience of 25 years' rectifier development and manufacturing technique. With such a background, Westalite has qualities possessed by no other metal rectifier, qualities which have been proved in long and efficient service under the most arduous conditions.

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**. . . but in the case of volts and amps,**

when dependability and efficiency matter most

**Britannic Cables carry the load . . .**

Britannic Cables for power, for mining and heavy industrial use, and for the domestic field, are available in a wide range of sizes and specifications at fully competitive prices — Britannic is independent. Send your enquiries through your usual wholesaler or to us direct.

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● BRITANNIC ELECTRIC CABLE & CONSTRUCTION CO LTD · IVER · BUCKS

**An independent company**

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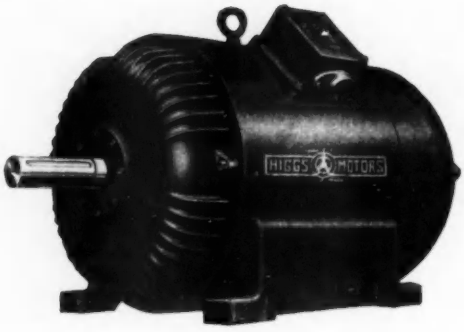
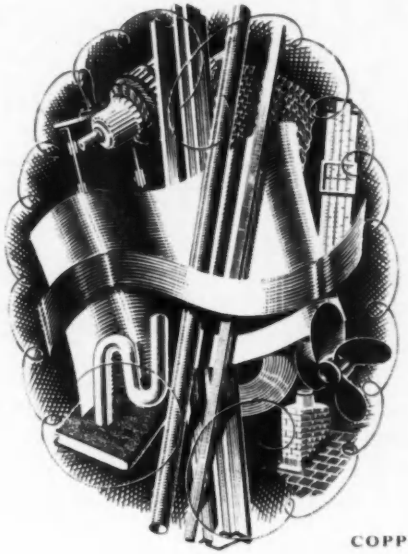
BIRMINGHAM 6 ENGLAND




TOTALLY ENCLOSED
FAN COOLED
The Higgs Motor that gives confidence under the most adverse running conditions
**GUARANTEED FOR EVER**

**Belfast, Birmingham, Bristol, Dundee, Glasgow, London, Manchester, Newcastle, Peterborough, Sheffield, Wolverhampton**

G 50



# Helping COPPER to help the nation

COPPER DEVELOPMENT ASSOCIATION exists to promote the wider and more efficient use of copper and its alloys and to bridge the gap between technical developments and their practical application in industry. The C.D.A. is backed by the resources of the whole British copper industry and is in a unique position to help copper to help you, no matter what your interest may be.

The Association, which is a non-trading organisation, can tell you what copper and its alloys can or cannot do and how they can be used to the best advantage. Its services are available to all entirely free of charge or obligation. You have only to ask.

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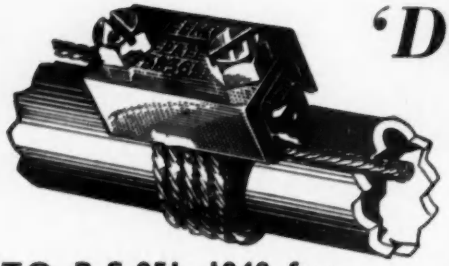

# 'DOWN' TO EARTH?

## THEN IT'S UP TO THE

# "ELMO" EARTHING CLIP

*The CLIP with a GRIP!*

**TO B.S.951—1948 for B.S. CONDUIT SIZES 1-3**

THE Elmo Earthing Clip, tried and proved in electrical resistance and torque tests, is tough, safe and secure —a perfect earth. It has a larger contact surface than any other earthing clip; the earth wire, held permanently under tension, cannot be pulled out. For sheer 'down to earth' efficiency this 'Clip with a Grip' is unbeatable, and can be sold with every assurance of your customer's *lasting* satisfaction.

***Write for samples to*-M. MOLE & SON LTD. 51-56. CHARLOTTE ST. BIRMINGHAM 3**

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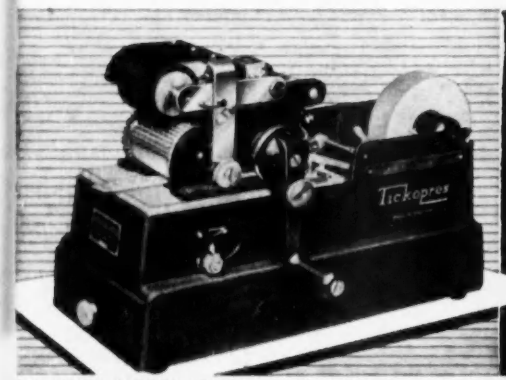



*Your overprinting problems end...*

**WHEN YOU INVEST IN A**

# 'TICKOPRES'

**NO MORE RUBBER STAMPS - NO MORE HANDWRITING - NO MORE WAITING FOR THE PRINTER**

Any girl or boy in your factory using the TICKOPRES printing machine can overprint all the details on to any quantity of your box ends, labels, tickets, tags, rolls of perforated tickets, etc. Every turn of the handle produces a completed ticket or label.

★ *Free test offer* — *Slip a dozen of each of your tickets and labels into an envelope with details you would like overprinted. One of our girls will overprint them for you.*

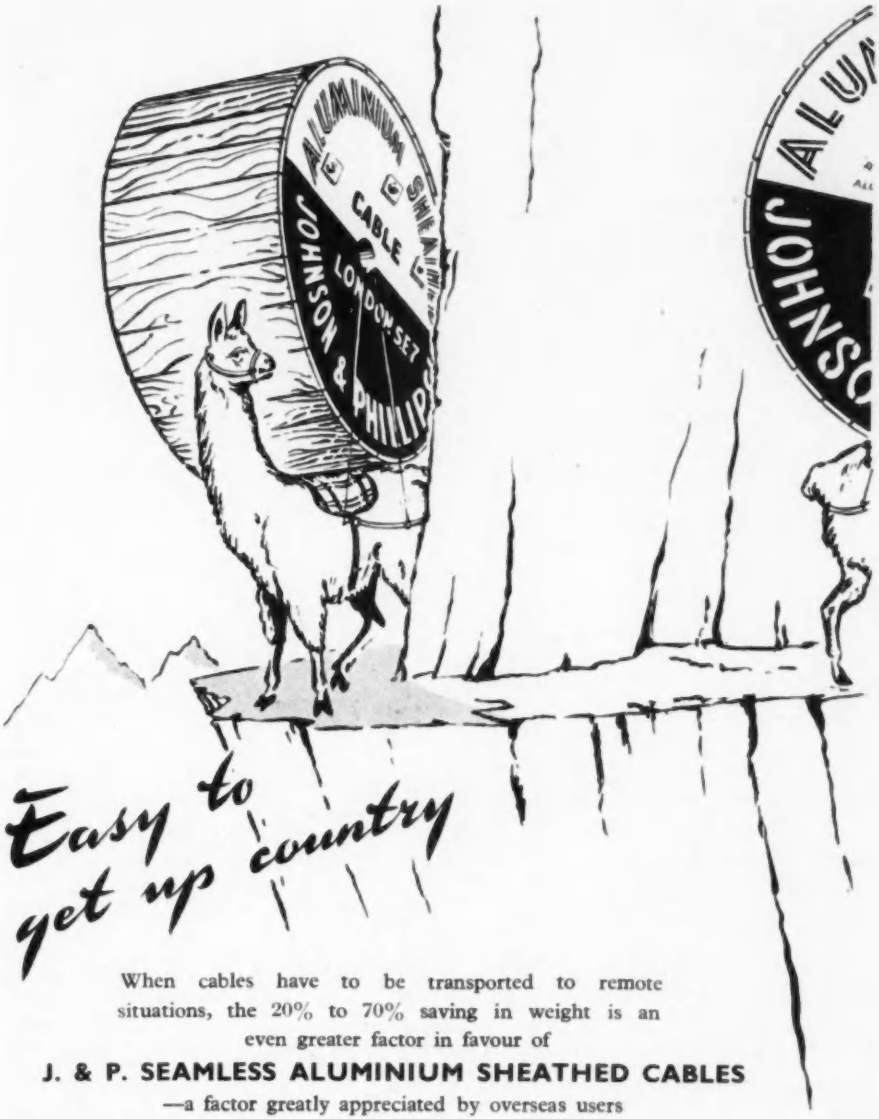
**You will be Amazed at the Results**

**See us at Stand F.49 B.I.F. OLYMPIA**

**DAPAG (1943) LTD.,** DEPT. E.T.

**23, HOLBORN VIADUCT, LONDON, E.C.1** *'Phone : CITY 5373-4*

**Dapag (1943) LTD**




# *Easy to get up country*

When cables have to be transported to remote situations, the 20% to 70% saving in weight is an even greater factor in favour of

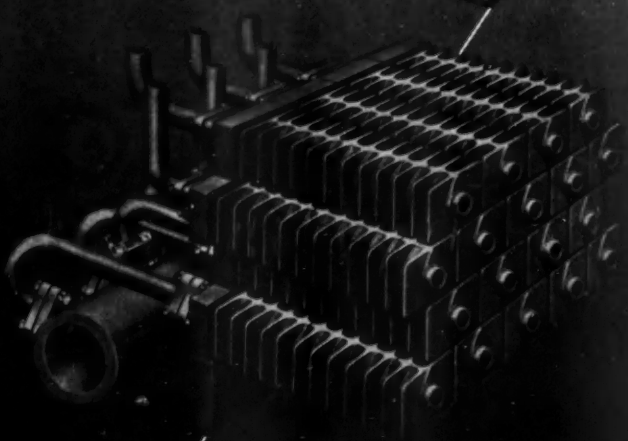
**J. & P. SEAMLESS ALUMINIUM SHEATHED CABLES**

—a factor greatly appreciated by overseas users

*British Patent Nos.* 627815 & 627793

**JOHNSON & PHILLIPS LTD.**
CHARLTON LONDON S.E.7
*The mark that means that "little more" in quality*

*The* truly modern
DESIGN



The illustration shows Green's Premier Diamond Economiser, Type 12, with steel tubes and cast-iron gilled sleeves.

PREMIER DIAMOND
GREEN'S economisers
E. GREEN & SON LTD., WAKEFIELD

*Makers of economisers for one hundred years*

GE58

BIF

## STAND C.519/418

**BRITISH INDUSTRIES FAIR, BIRMINGHAM**

**MAY 8 - 19**

Brush look forward to the B.I.F. and to meeting their many friends from all over the world.
The above is an artist's impression of our office at the B.I.F., 1950 and we extend a welcome to visitors from Home and Overseas.

We shall be exhibiting a comprehensive range of products and our technical engineers will be available for consultation. For the benefit of the overseas visitor, arrangements have been made for quotations to be prepared at the Fair.

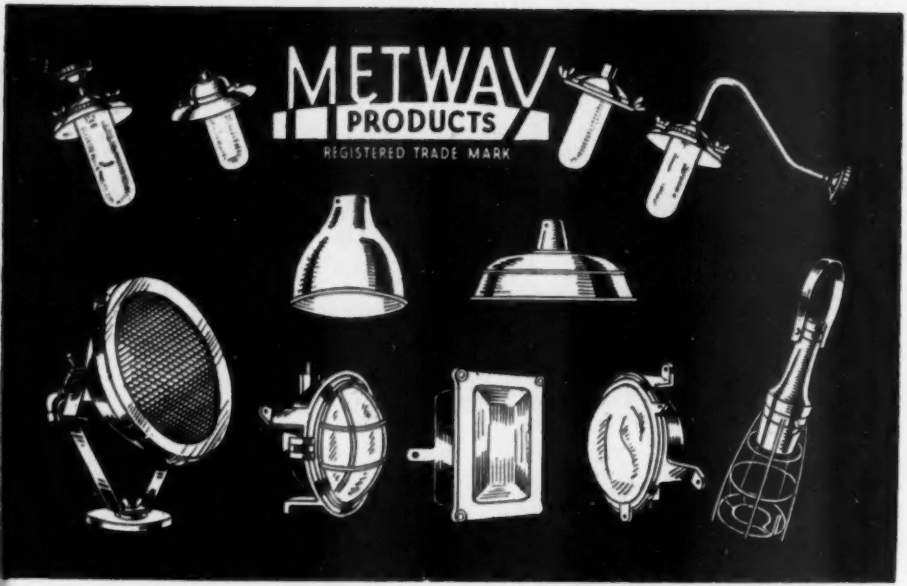
For Turbo-Alternators, Transformers, Switchgear,
A.C. and D.C. Motors and Generators,
Diesel-Electric Locomotives,

***the best answer is*** BRUSH

THE BRUSH ELECTRICAL ENGINEERING CO. LTD., LOUGHBOROUGH, ENGLAND

*Branches: London, Birmingham, Cardiff, Manchester, Leeds, Newcastle, Glasgow.*

15-4




METWAY ELECTRICAL INDUSTRIES LTD.
KING STREET, BRIGHTON, 1, SUSSEX
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TIME SWITCHES
FOR PUBLIC LIGHTING & INDUSTRIAL & DOMESTIC USE
MANUFACTURED BY
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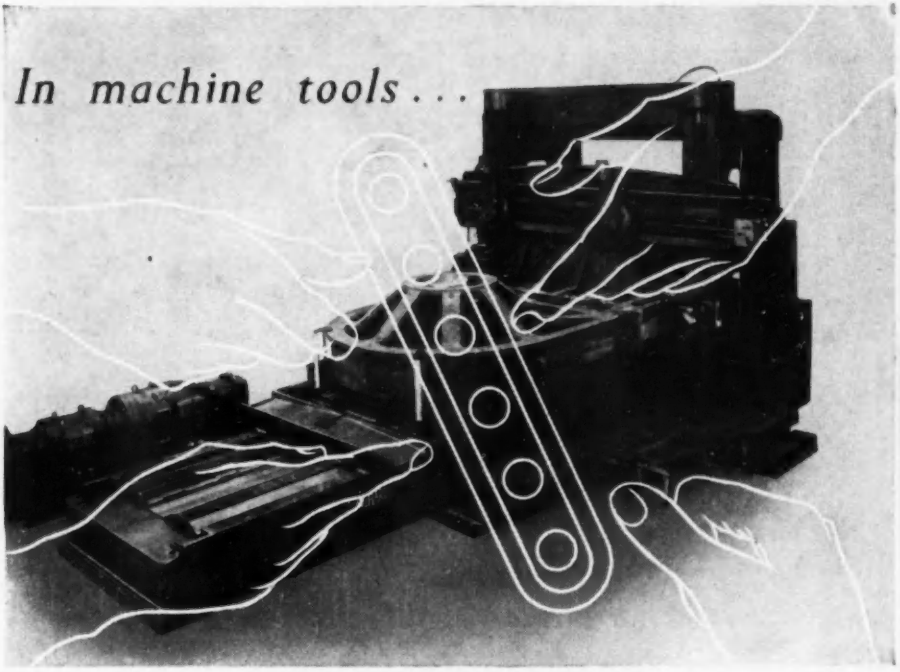
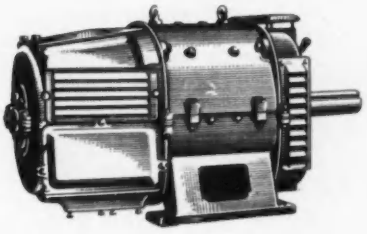



# Push Buttons for Productivity

Even in the up-to-date production shop there is room for reducing time-wasting manual labour by thoughtfully applied electrical drives. In the M-V Motor Department are engineers who really understand the electrical problems of the machine-tool industry and their advice is available at the drawing board stage for new machines or on the conversion of existing equipment.

*A typical Metrovick Type "Q" Direct Current Motor.*

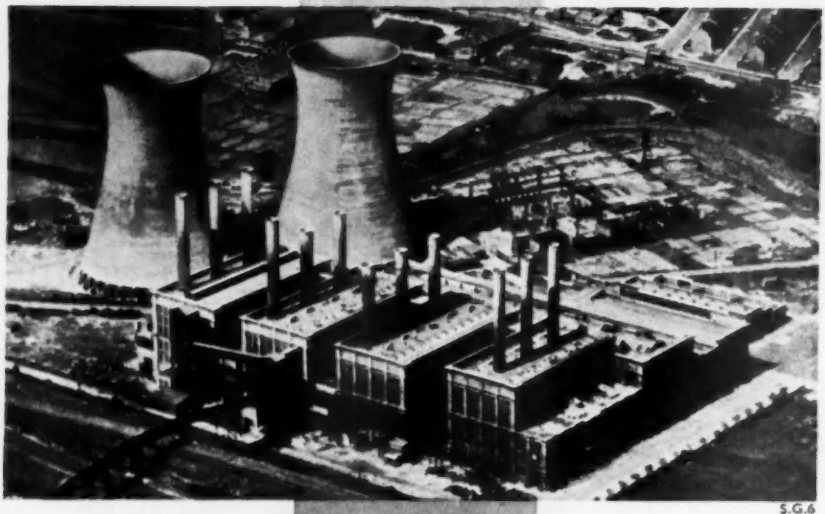


METROPOLITAN-VICKERS ELECTRICAL CO. LTD., TRAFFORD PARK, MANCHESTER, 17

METROVICK *Motors for all Industrial Drives*

JA/002

## POWER IN THE MAKING



S.G.6

### No. 6—Kirkstall Generating Station

There is combustion history in the development of pulverised fuel equipment at this important station. When the plant was designed in 1927 it was considered that a coal carbonisation plant might be installed in conjunction with a central system of powdered coal preparation. This possibility influenced the plant layout.

Coal for the first two boiler houses is pulverised in another building by Raymond vertical roll mills with separately fired dryers. The powdered coal is transported in aerated form to storage bunkers near the boilers.

In later installations, however, the unit system with mill drying is in use, giving a more compact layout. The third boiler house has Impax high speed mills and the fourth, opened in 1948, four LM medium speed roll mills with each of the three boilers. Burners are the short flame, turbulent flow type, placed two in each side wall of the furnace and horizontally opposed. The furnace itself is of modern, fully-cooled design.

To-day at nearby Skelton Grange, even larger 'International' radiant heat boilers with adjustable tangential firing are being built. They, in turn, will be followed by still larger steam generators for unit coupling to 60,000 kW sets giving an ultimate capacity of 360,000 kW.

ICL

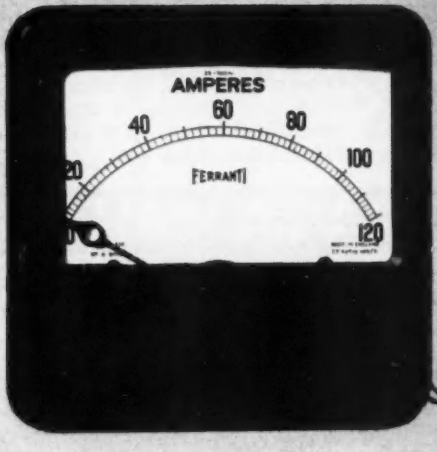
**INTERNATIONAL COMBUSTION LTD**

*London Office:* NINETEEN WOBURN PLACE, W.C.1

*Works:* DERBY, ENGLAND; PORT ELIZABETH, SOUTH AFRICA; SYDNEY, AUSTRALIA

# FERRANTI

## *Switchboard Instruments*




**4" 6" and 8" Round Pattern**

**6" Round Pattern, hermetically sealed for severe tropical conditions.**

**6" Square Dial (as illustrated)**

*British Standard First Grade Accuracy.*

F
FERRANTI

*Foremost since the earliest days of electrical development*

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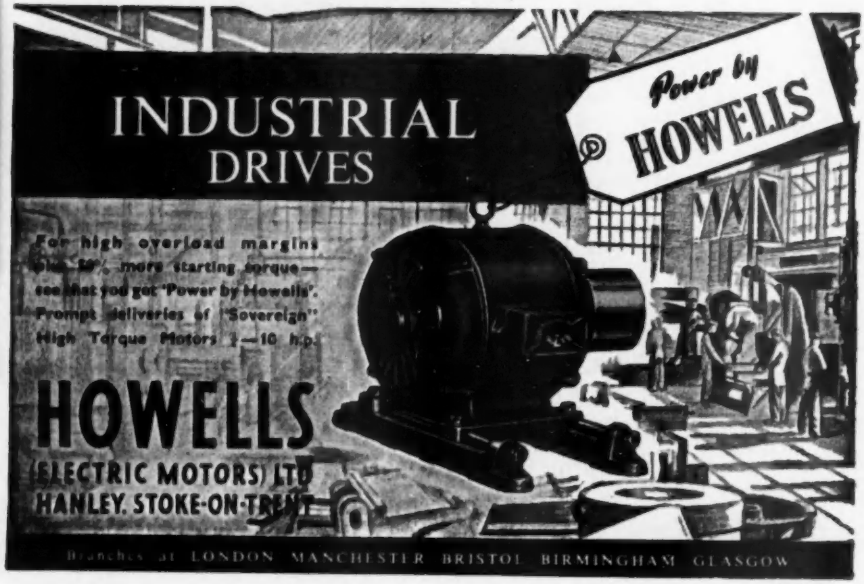
HOLLINWOOD, LANCS. *London Office:* KERN HOUSE, KINGSWAY, W.C.2.

FI. 72

Thirteen panel, double-tier main A.C. Switchboard installed in new Palace of Westminster. Dorman & Smith Ltd., have supplied the major part of the switch and distribution gear for the general Palace of Westminster scheme.

DORMAN & SMITH LTD
MANCHESTER · 5

ET 2M 50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DRIVES
Power by
HOWELLS
For high overload margins plus 50% more starting torque—see that you get 'Power by Howells'. Prompt deliveries of "Sovereign" High Torque Motors 1—10 h.p.
HOWELLS
(ELECTRIC MOTORS) LTD
HANLEY, STOKE-ON-TRENT
Branches at LONDON MANCHESTER BRISTOL BIRMINGHAM GLASGOW

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Truly international—entirely devoted to actual business—packed with industrial goods, crammed with consumer products . . . for men of affairs everywhere, *the C.I.T.F. is too important to miss!*

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**LIVERPOOL:** M. J. Vechsler, Canadian Government Trade Commissioner, Martins Bank Building, Water Street.

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***Canadian International Trade Fair***

MAY 29—JUNE 9, 1950, TORONTO, CANADA

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# heavy power cables

Fine wires to heavy power cables—we make them all, for the Enfield Companies refine, roll, draw and insulate copper up to 264 kV.

Process control is rigid and the result is cable and wires your engineers are glad to use.

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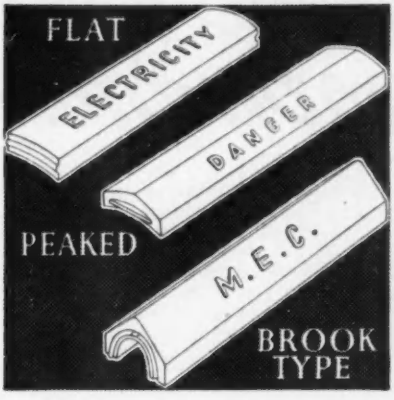
**BELFAST, BIRMINGHAM, BRIGHTON, BRISTOL, CARDIFF, GLASGOW, HULL, IPSWICH, LEEDS, MANCHESTER, NEWCASTLE, NOTTINGHAM, SELBY, SOUTHAMPTON and throughout the world.**

# CABLE COVERS



**VINCULUM CONCRETE Cable Covers. Easy to lay but difficult to displace. The ends are shaped concave and convex and are joggled in thickness. The joint interlocks and prevents lateral and vertical displacement. Stock markings are Electricity and Danger, other marks to order. Thoroughly reinforced with main and cross bars, or to B.E.A. Specification.**

| TYPE | SIZE | NO. PER TON |
|---|---|---|
| Flat | 36" × 12" × 2" | 30 |
| ,, | ,, 11" ,, | 32 |
| ,, | ,, 10" ,, | 35 |
| ,, | ,, 9" ,, | 40 |
| ,, | ,, 8" ,, | 45 |
| ,, | ,, 7" ,, | 50 |
| ,, | ,, 6" ,, | 60 |
| ,, | 18" × 6" ,, | 120 |
| Peaked | 36" × 12" × 2½" to 1½" | 30 |
| ,, | ,, 11" ,, ,, | 32 |
| ,, | ,, 10" ,, ,, | 35 |
| ,, | ,, 9" ,, ,, | 40 |
| ,, | ,, 8" ,, ,, | 45 |
| ,, | ,, 7" ,, ,, | 50 |
| ,, | ,, 6" ,, ,, | 60 |
| ,, | 18" × 6" × 2" to 1" | 160 |
| ,, | 18" × 4½" ,, ,, | 200 |

*Brook Type are made in three sizes for cables up to 1⅜", 2¼", and 3" diameter. Radius Units are made to work with all three sizes.*

Other Units for the Electrical Engineer include Joint Coffins, Tee-Service and Couplings Boxes, Cable Posts, Pole Splints, Ducts and Covers, Valve Chambers, etc.
Paving Flags and Road Kerb,
Fencing for every purpose,
Walling Blocks, Floors & Roofs.
Sectional and pre-fabricated hutting, Tunnel Units, etc.

**Quotations by return of post for any quantity. Immediate deliveries by road alongside trenches to suit daily requirements, or by rail to nearest station.**

*Head and Registered Office*

TARMAC LIMITED,
VINCULUM DEPT.,
ETTINGSHALL,
WOLVERHAMPTON.

Telephone: Bilston 41101-8

# SPEED UP PRODUCTION

HENLEY SOLON ELECTRIC SOLDERING IRONS

Henley Solons get through the job with speed and precision. Practical experience in factory and workshop has proved their capacity for continuous hard work under all conditions. 5 models: 65 watt oval tapered and round pencil bits; 125 watt oval tapered and round pencil bits; and 240 watt oval tapered bit. Voltage range: 100 to 250. Perfectly balanced; each with 6 feet 3-core Henley flexible. Equip your works with Solons and speed-up production. Now available from stock. Write for folder Y.10.

**W. T. HENLEY'S TELEGRAPH WORKS Co. Ltd.**
**51-53 Hatton Garden, London, E.C.1**

---

## The WORTHINGTON-SIMPSON MONOBLOC

*The most modern Centrifugal Pump*

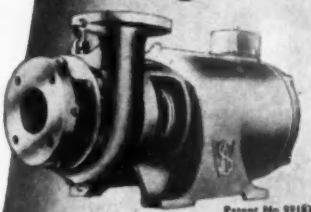
**Note these Features . . .**

Which mean a superior performance over a longer life

- No shaft wear
- Separable liquid end
- Only one stuffing box
- Suction pressure on stuffing box
- Hydraulically balanced impeller
- Accessibility
- Shaft protected from liquid
- Quietness in operation
- Renewable wearing parts
- Choice of materials of construction

. . . and all the outstanding advantages of the Monobloc construction . . .

- Pump & motor one unit
- Compactness
- Easy installation
- Few parts
- Base integral
- Only one shaft
- No danger of misalignment
- Freedom from vibration
- No belts, pulleys or couplings
- Horizontal or vertical installation
- Low initial cost
- Low power consumption



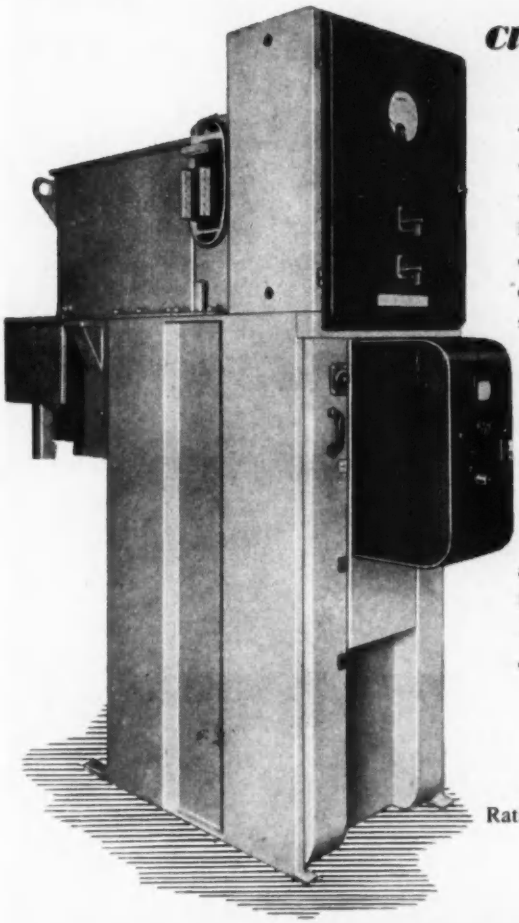
Patent No 891836

Sizes range from 1" to 5" and ¼ to 30 B.H.P.
Capacities up to 1200 G.P.M.
and Heads up to 380 Feet.

**WORTHINGTON-SIMPSON LTD.**
NEWARK, NOTTS.

# Metalclad Switchgear

## Vertical-plugging



### *Class QF 10*

This is the latest addition to a well-established range of metalclad vertical-plugging equipment, and has been introduced to meet the demand for increased breaking-capacity in power-stations, sub-stations and industrial installations. It forms an extension to the well-known Class QF 341/361 switchgear, and incorporates many of its successful features, including the BTH single-break oil circuit-breaker with self-compensated arc-control chambers. Its high breaking capacity—350 MVA—has been achieved with units only 2 *feet*, 3 *ins. wide*.

Ratings: 350 MVA at 6.6 and 11 kV

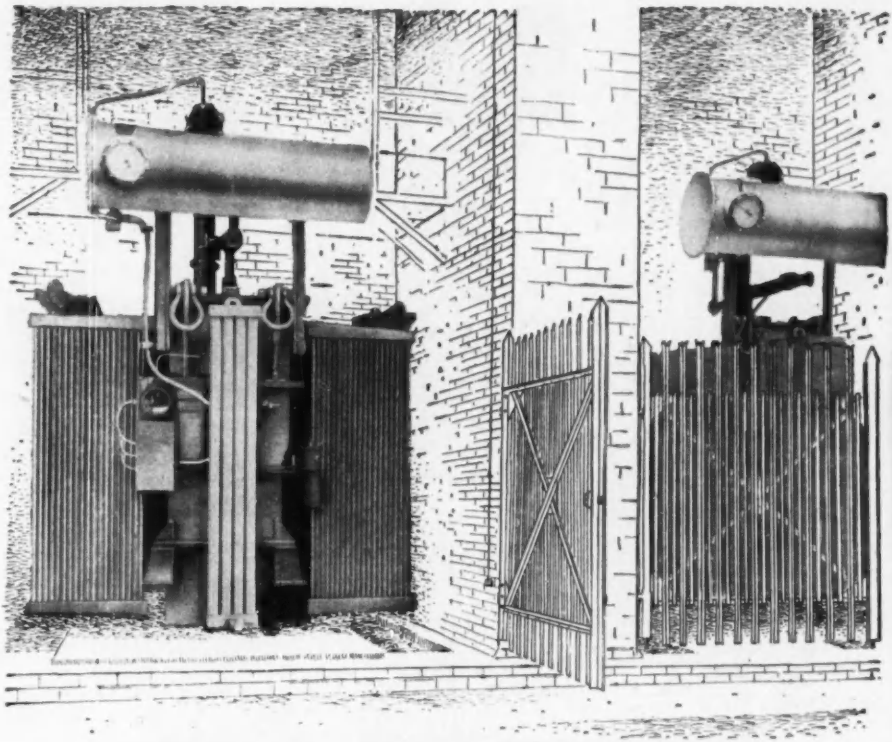
up to 1,600 amperes.

**BRITISH THOMSON-HOUSTON**

THE BRITISH THOMSON-HOUSTON CO. LTD. WILLESDEN, ENGLAND

A3909

TEMCO wiring accessories are available in
WHITE
List numbers are clearly quoted in our Accessory Catalogue, a copy of which will be sent on request
T. M. C.-HARWELL (SALES) LTD
37 UPPER BERKELEY ST., LONDON, W.1 Telephone: Paddington 1867-8-9



# TRANSFORMERS

## *by* G.E.C.

Two of the 5,000 kVA, 11,800/3,000 volt turbine house unit transformers at the Meaford Power Station of the B.E.A.
The whole of the electrical equipment for this Power Station was supplied by The G.E.C.

MAY 8-19

*Britain has invited the World!*

Preparations for this year's British Industries Fair began before B.I.F. closed in 1949. To build up the greatest commercial event of 1950 organization has been continuous.

**DURING THE SUMMER**
3,050 manufacturers applied for a million square feet of display space. Exhibitors in 90 trades were allocated to 32 groups of allied industries.

**IN AUTUMN**
120,000 buyers throughout the world began to receive personal invitations.

**THROUGH THE WINTER**
63 advertising campaigns were launched in 33 languages—and a special campaign was prepared in America.

**IN THE NEW YEAR**
27,000 advance *catalogues were sent exclusively to buyers abroad.

**BY SPRINGTIME**
10,000,000 pieces of printed information had been distributed within business communities overseas.

★

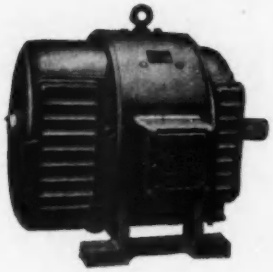
**NOW**—*some 15,000 importers are travelling here to see what we can make.*

*Will you be there?*

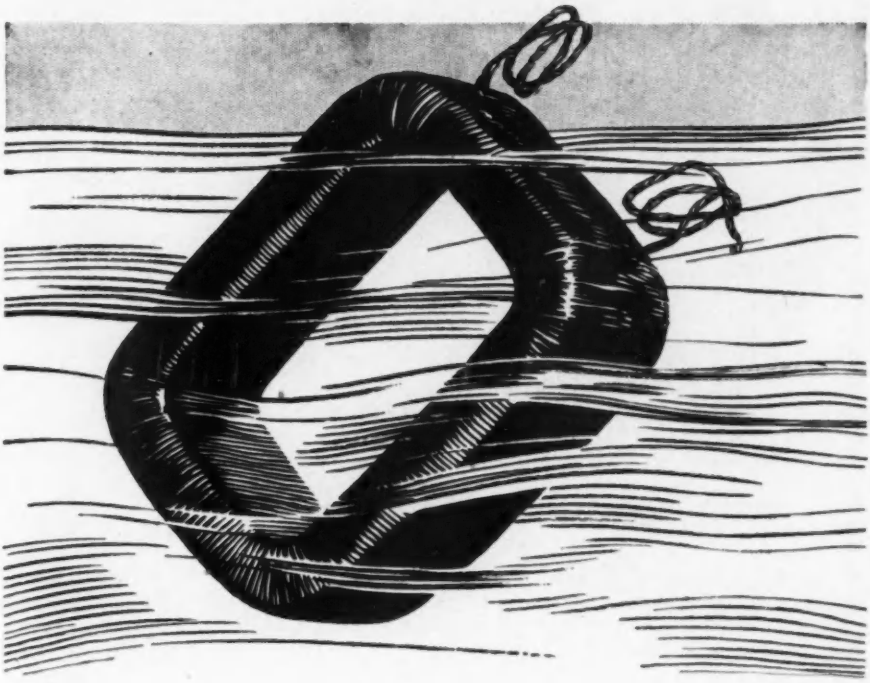
**LONDON—Earls Court and Olympia.** Weekdays 9.30 a.m.—6 p.m. Buyers Badges and *Catalogues, 2/6 each, obtainable only at Fair. Public admitted Saturday and Wednesday (May 13 and 17) 1/6 each building.

**BIRMINGHAM—Castle Bromwich.** Weekdays 9.30 a.m.—6 p.m. Buyers Badges and *Catalogues, 2/6 each, obtainable only at Fair. Public admitted daily from 2 p.m. (all day Saturday) 2/6.

**ELECTRICAL EQUIPMENT AT CASTLE BROMWICH**



# In all Crompton D.C. motors



Tests made on the field coils of Crompton D.C. motors prove that the insulation is unharmed after immersion in brine or in oil for months on end. The secret lies in impregnation with a thermal setting synthetic resin varnish which seals the coil against dirt, oil or moisture. Crompton have been pioneering improvements like this for over 70 years. No wonder you think instinctively of Crompton for D.C. motors.

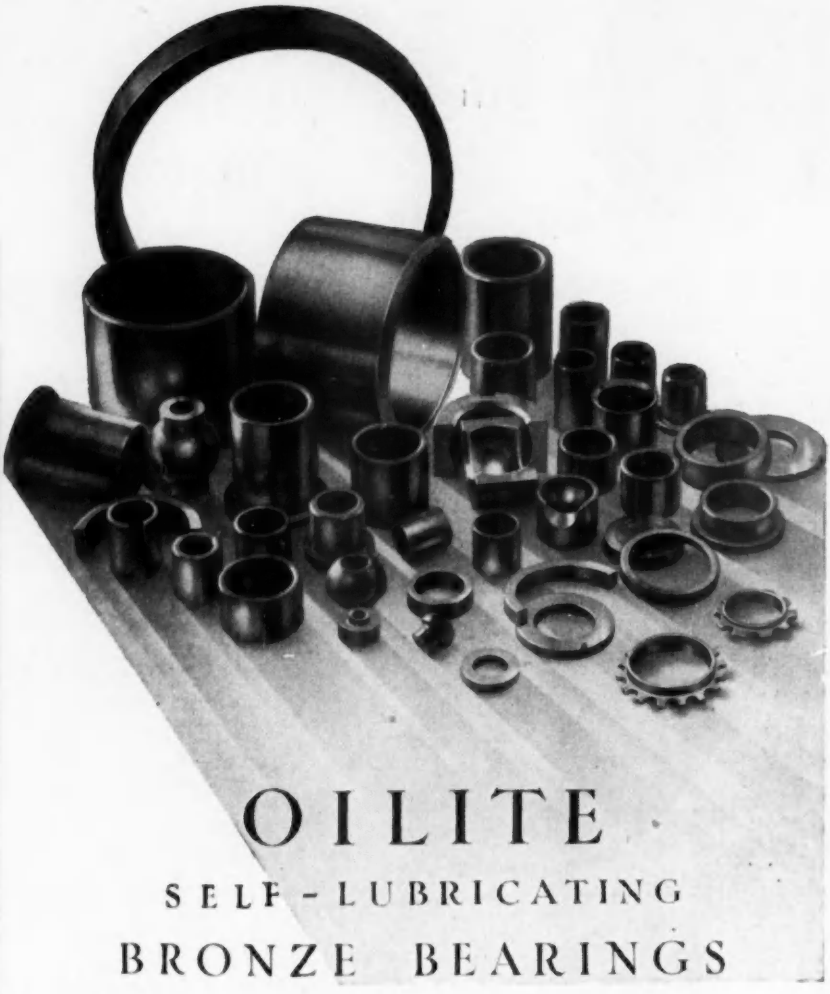
**D.C. MOTORS—**

*ONE OF THE PRODUCTS OF THE PLANT DIVISION*

**Crompton Parkinson**

LIMITED

CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2



OILITE

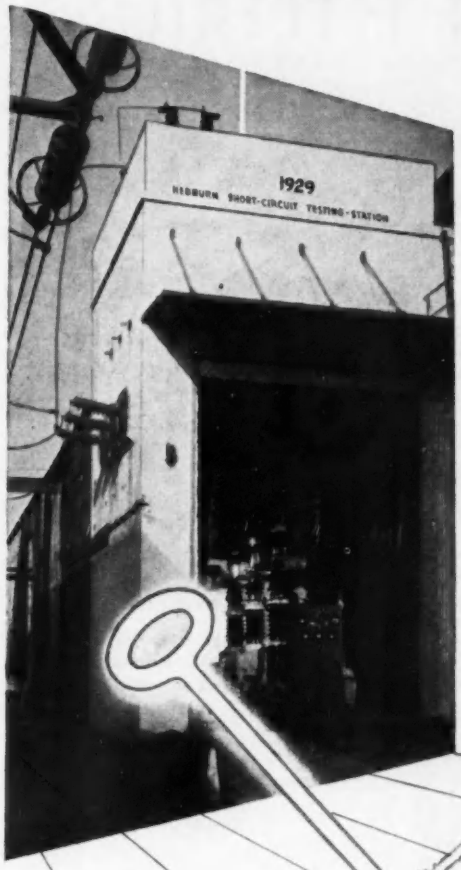
SELF-LUBRICATING

BRONZE BEARINGS

Contain sufficient lubricant to meet wide variations of speed and load over protracted periods of actual service. The accuracy of the finished dimensions can be maintained to close tolerance thus ensuring interchangeability

THE MANGANESE BRONZE & BRASS CO. LTD
HANDFORD WORKS, IPSWICH TELEPHONE IPSWICH 2127 TELEGRAMS BRONZE IPSWICH

# Coming-of-age




INCORPORATED IN REYROLLE SWITCHGEAR ARE 21 YEARS OF SHORT-CIRCUIT TESTING AND A LIFETIME OF RESEARCH AND EXPERIENCE.

THE KEY TO GUARANTEED SHORT-CIRCUIT PERFORMANCE

**REYROLLE**

HEBBURN Co DURHAM ENGLAND

See our exhibit at STAND No. C 405 B.I.F. BIRMINGHAM

# 'ENGLISH ELECTRIC'

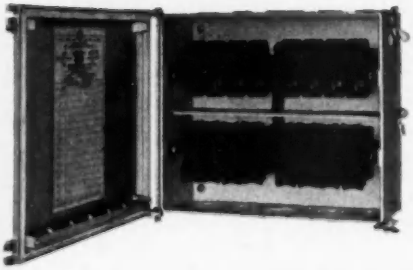
## *metal-clad distribution fuse boards*

**AVAILABLE FOR EARLY DELIVERY**

**Incorporating 'ENGLISH ELECTRIC' high rupturing capacity cartridge fuse links (A.S.T.A. certified for BS88-1947) in moulded fuse units.**

FOR THREE PHASE POWER
Type 'NS' 440 volt 15 amp.

*We invite your enquiries for distribution fuse boards of heavier current ratings and for special applications.*



FOR SINGLE PHASE LIGHTING HEATING AND POWER.
Type 'SS' 250 volt 15 amp.

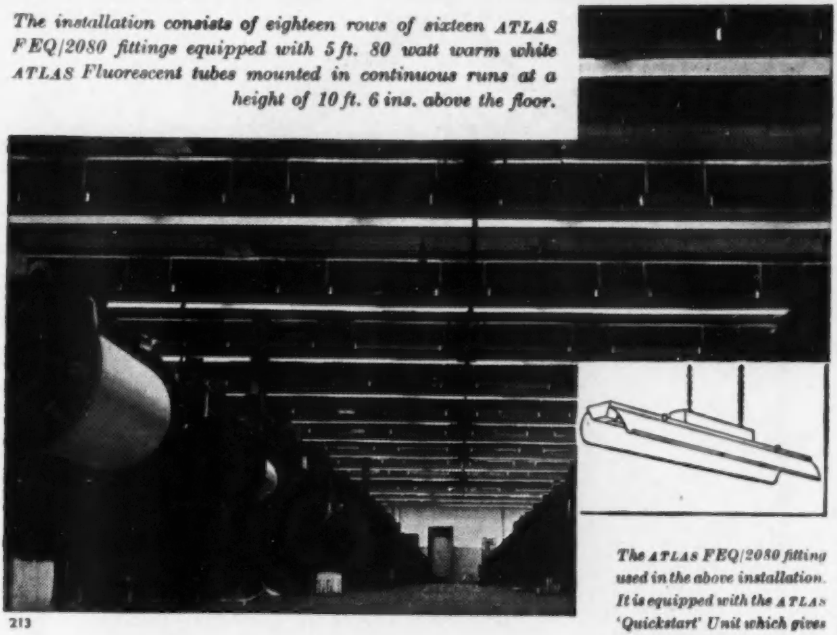
**The ENGLISH ELECTRIC Company Ltd.**

**FUSEGEAR WORKS - EAST LANCASHIRE Rᴰ, LIVERPOOL, 10**

Works also at STAFFORD · PRESTON · RUGBY · BRADFORD

**BRITISH INDUSTRIES FAIR, BIRMINGHAM — STAND No. C613/512**

*The installation consists of eighteen rows of sixteen ATLAS FEQ/2080 fittings equipped with 5 ft. 80 watt warm white ATLAS Fluorescent tubes mounted in continuous runs at a height of 10 ft. 6 ins. above the floor.*



213



*The ATLAS FEQ/2080 fitting used in the above installation. It is equipped with the ATLAS 'Quickstart' Unit which gives instant illumination and maintains the intensity of the light during voltage variations*

# LOOMS and LUMENS

In this large modern silk weaving shed of Messrs. Tootal, Broadhurst Lee & Co. Ltd. ATLAS Fluorescent provides, at extremely low current cost, an average illumination of 40 lumens per square foot. The light diffused over each working area is perfect and uniform, casting no shadows, and open top construction of the fittings provides upward lighting as well, with the result that a light ceiling adds to the effect already achieved. May we remind you that the ATLAS range, comprising more than 30 different fittings for all purposes, gives you access to every fluorescent lighting market, and that our engineers will always gladly assist you in planning any lighting installation.

**ATLAS FLUORESCENT**

*for Industrial, Commercial, Domestic & Street Lighting*

THORN ELECTRICAL INDUSTRIES LTD., 105-109, JUDD ST., LONDON, WC1. PHONE: EUSTON 1183

COOKING IN CRAMPED QUARTERS?

**The ready-made solution**

is the Creda Cadet. Not just another breakfast cooker—it's designed to do *all* cookery jobs. The Cadet is *fully insulated*, has a thermostatically controlled oven, radiant type boiling plate controlled by Simmerstat and a warming cupboard. And, so important from the customer's point of view—the Cadet connects to an ordinary domestic heating point. Total wattage **2,850** Catalogue No. CT1

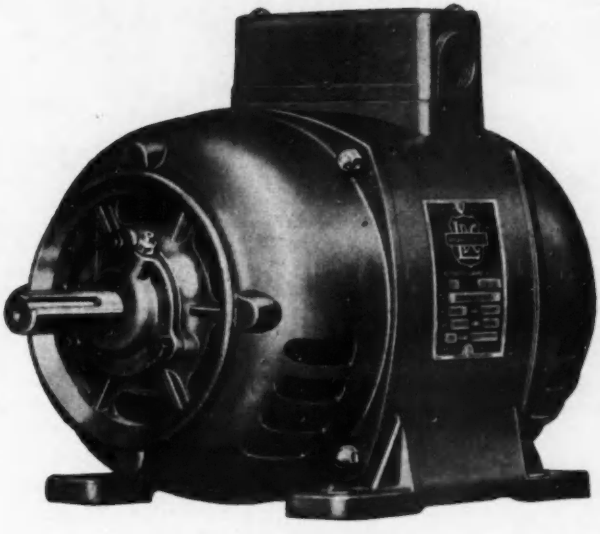
**Creda CADET**

MADE BY THE HOUSE OF **Simplex**

SIMPLEX ELECTRIC COMPANY LIMITED
OLDBURY BIRMINGHAM AND BRANCHES

A TI COMPANY

BLUE BANTAM



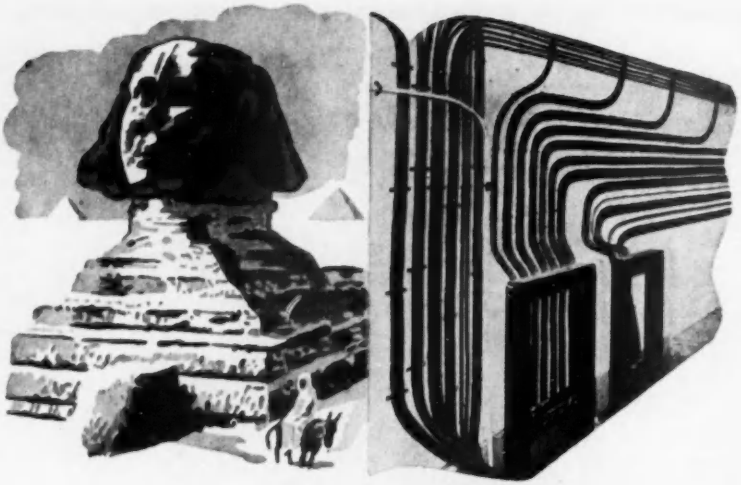
THE MODERN
FRACTIONAL H.P. MOTOR

LANCASHIRE DYNAMO & CRYPTO LTD

Trafford Park, Manchester, 17 · Cardiff · Willesden, London, N.W.10

London Office & Export Dept., 94 Petty France, S.W.1

*Associated Companies:*
Foster Transformers & Switchgear Ltd. · Crypto Ltd. · Crypton Equipment Ltd. · Nevelin Electric Co., Ltd.



TO ALL INTENTS AND PURPOSES

—EVERLASTING

Install "Pyrotenax" M.I. Cables and your wiring is "there for keeps"—one dependable factor in an otherwise uncertain world. No more hold-ups while someone goes to find the electrician, no more costs for renewals, not even a maintenance charge to meet. Composed entirely of copper and a mineral insulant, both non-ageing, "Pyrotenax" M.I. Cables are self-protected - fire-resistant, unaffected by oil, water, condensation or the grossest ill-usage. "Pyrotenax" M.I. Cables conform to all recognised requirements, are readily adaptable to all standard electrical fittings and can be bent easily to any shape required.

**ARE GIVING SAFE AND PERMANENT SERVICE IN**

Electrical Generating Stations, Factories and Workshops, Aerodromes, Shipyards and Ships, Oil Pumping and Storage Installations, and Buildings of every kind.

PYROTENAX Cables—
MINERAL INSULATED COPPER COVERED
for LOW TENSION LIGHTING, POWER & CONTROL WIRING

*"Pyrotenax" is an exclusive trade mark name, and must only be used to designate cables and other products manufactured by this company and its associates.*

**PYROTENAX LIMITED, HEBBURN-ON-TYNE. TEL.: HEBBURN 32244-7**

LONDON: 7 Victoria St., S.W.1. Tel.: ABBey 1654-5. BIRMINGHAM: 2 Moor St. Tel.: Midland 1265

# The Trade Welcomes...

*"I should like to congratulate you on your Switch Fuse Control Units. I have handled all the different makes so far and can find nothing to compare with yours."*

—Extract from Contractor's letter;

and others say:—

*"Just what I wanted—I've been looking for it for years!"*

*"You've got a Winner!"*

*"Without looking at the name, you can tell it's a Wylex job!"*

## WYLEX
## Switch Fuse Control Unit

Customers have expressed appreciation of the quality; the neat design; the easy wiring; the easy method of stocking—

**BUILD UP YOUR FUSE BOARD AS YOU WANT IT!**

*Write for fully Illustrated Brochure to:*

**GEORGE H. SCHOLES & CO. LTD.**

WYLEX WORKS · WYTHENSHAWE · MANCHESTER

# OVERHEAD BUSBARS

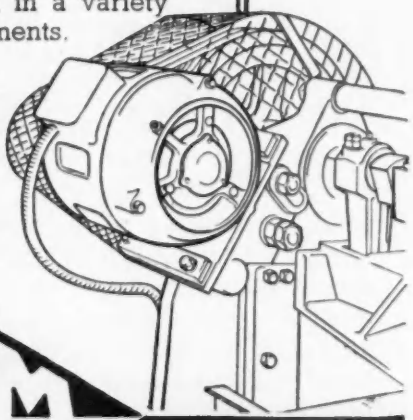
## THE B.B.T. SYSTEM

The B.B.T. Bus-Bar Trunking System is considered by many to be the best method of distributing Electric Power in Machine Shops and other indoor locations where power is required at points not too widely separated.

The B.B.T. System consists of bare copper Bus-Bars housed in a steel duct. Tapping points are provided at intervals of two feet along the duct. Fused Tapping Boxes can be plugged into these as required, and the load connected by short runs of cable in conduit.

B.B.T. Bus-Bar Trunking is made in standard 12 ft. lengths. These can be erected in a variety of ways to suit individual requirements. This ideal system is reasonable in first cost, cheap to install, and capable of alteration with all speed, with the minimum loss of production hours.

The B.B.T. Bus - Bar Trunking System is fully described and illustrated in Catalogue B.B.T. 102, copies of which are available on application.



Switchgear Manufacturers — ENGINEERING (ACTON) LTD — Mechanical Engineers

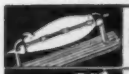
**STANDARD ROAD, NORTH ACTON, LONDON, N.W.10** *Tel. ELGar 6601*

*Overseas Agents :—*

*Comptoir Commercial International Antwerp • Hamer Electrical Christchurch N.Z. • G. H. Langler Johannesburg • Norton & Co. 28 Calcada do Sacramento Lisbon • Ralli Brothers Ltd Pakistan • Rallis India Ltd • Rhodelect Salisbury S. Rhodesia • Swire & Maclaine Shanghai & Hong Kong.*

# ELECTRIC LIGHT . . . THE SIEMENS STORY

*A SERIES OF ADVERTISEMENTS SHOWING THE PROGRESS OF ELECTRIC LIGHTING DURING THE PAST 80 YEARS*

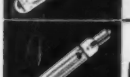

1878 CARBON FILAMENT

1903 TANTALUM METAL FILAMENT

1910 SIEMENS TUNGSTEN FILAMENT

1915 SIEMENS GASFILLED

1930 SIERAY GASEOUS DISCHARGE


1935 SIERAY DUAL


1940 SIERAY FLUORESCENT

*No.12* **SIERAY MELLOW** *- the Latest Lamp*

In this series we have traced the story of Electric Light from the erratic, harsh Arc Lamp of the 1870's to the steady, shadowless Fluorescent Light of to-day.

Since the first (carbon) filament lamp — with its low-efficient yellow light — was invented in 1878, great progress has been made and very large sums of money expended in research at the SIEMENS laboratories.

Now, at the SIEMENS Preston Lamp Factory — designed and built expressly for the manufacture of fluorescent powders and lamps — the new SIERAY-MELLOW Fluorescent Lamp is being produced, giving a rich warm colour, kind and comfortable.

Not yet the last, but the very latest word in Electric Lighting.

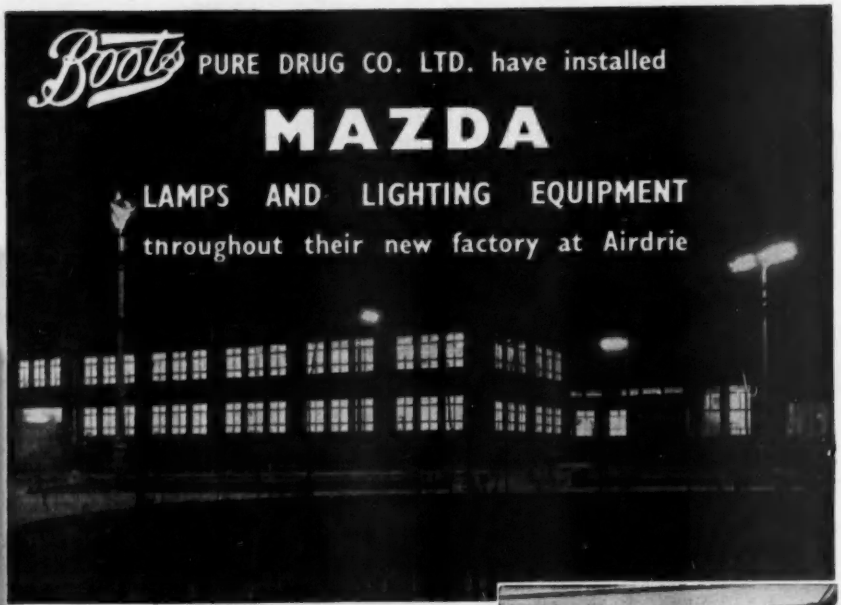
*TO-DAY* USE AND RECOMMEND

**SIEMENS LAMPS**

FOR LEADERSHIP IN MODERN LIGHTING

*Advt. of* SIEMENS ELECTRIC LAMPS AND SUPPLIES LIMITED, 38/39 Upper Thames Street, London, E.C.4.
Branches at Belfast, Birmingham, Bristol, Cardiff, Dublin, Glasgow, Leeds, Liverpool, Manchester, Newcastle-on-Tyne, Nottingham, Sheffield.

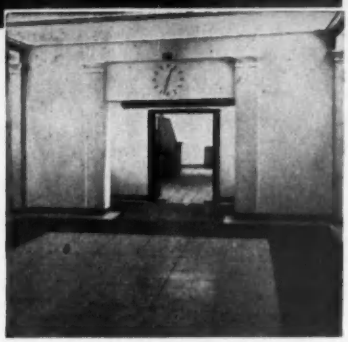
C




THE plans for this extensive lighting scheme were prepared by Boots engineers working in conjunction with BTH lighting engineers. The installation was carried out by Boots electrical department.

Thanks to constant research and development, Mazda Lamps are outshining lights with sellers and buyers alike. There's a Mazda for every form of interior or exterior lighting—domestic, commercial, industrial, scientific—made specially to give maximum efficiency, comfort, safety, economy.

● For expert advice on any lighting problem, consult any of the BTH offices.



*Mazda fluorescent lighting imparts an air of spaciousness to the Entrance Hall of the new Boots factory in Scotland.*

*Illustrated here is one of several types of Mazda fluorescent lamps and lighting fittings used in the new Boots factory shown above.*

MAZDA

**the outshining light**

**MAZDA LAMPS AND LIGHTING EQUIPMENT**

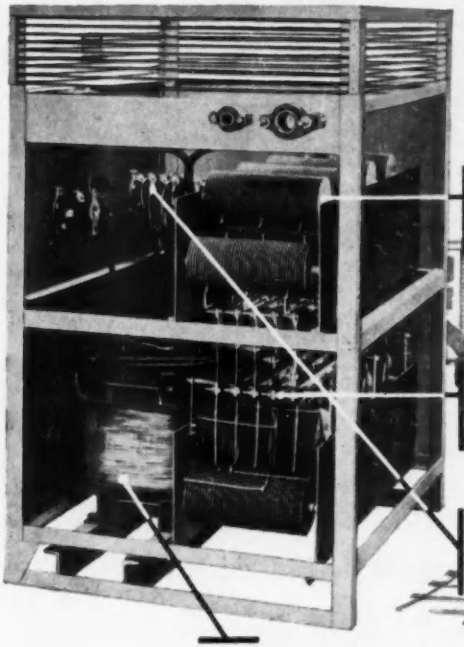
*Made in England by* BTH *Leaders in Lighting*

The British Thomson-Houston Co. Ltd., Crown House, Aldwych, London, W.C.2. Tel: TEMple Bar 8040

M4243

# CRYPTON

## Selenium Rectifiers FOR MINING

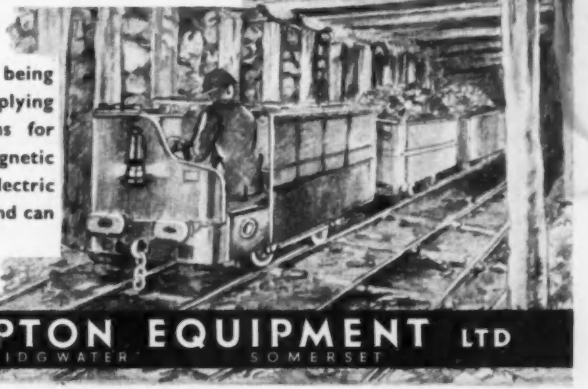


Metal Rectifier units are securely held in position to withstand vibration.

Full Wave bridge connected Selenium Metal Rectifiers.

Voltage Regulation by switch-tapping on the transformer primary.

Double wound, air cooled, liberally rated transformer.



Crypton Selenium Rectifiers are being used in the Mining Industry for supplying Direct Current from A.C. mains for operating Signalling Apparatus, Magnetic Separators, D.C. electric motors, Electric Vehicles, Battery Chargers, etc., and can be oil immersed when desirable.

IDC ORGANIZATION

**CRYPTON EQUIPMENT LTD**

BRIDGWATER SOMERSET

*Associated Companies:*

*Lancashire Dynamo & Crypto Ltd. Crypto Ltd. Foster Transformers & Switchgear Ltd. Nevalin Electric Co., Ltd.*

*In the home for a* **LIFETIME**

SWAN BRAND

ELECTRICAL APPLIANCES & ALUMINIUM HOLLOWARE

*Identified by the Quality*

*The "Mayfair" Electric Percolator is of copper, with chromium plated finish. Heat-resisting handle. Capacity 1¼ pints. Complete set includes percolator, cream jug, sugar basin and black tray. From good class Electrical Dealers, price £9.1.6d. (inc. P.T.).*

*Bulpitt & Sons Ltd., St. George's Works, Icknield St., Birmingham 18*

***This advertisement will appear during June in the following publications***

| | |
|---|---|
| Wife & Home | Home Chat |
| Woman's Journal | Illustrated |
| Woman's Own | Leader |
| Ideal Home | News of the World |

SWAN BRAND

ELECTRICAL APPLIANCES & ALUMINIUM HOLLOWARE

BULPITT & SONS LTD., ST. GEORGE'S WORKS, ICKNIELD ST., B'HAM 18

M-W.168

# ELECTRICAL TIMES

Vol. 117 No. 3051 THURSDAY, 27 APRIL, 1950

PUBLISHED EVERY THURSDAY

FIFTY-NINTH YEAR OF PUBLICATION



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# G.E.C. MAIN ROAD LIGHTING *at* LOUGHTON

This illustration shows a part of the lighting installation at Loughton, where 128 G.E.C. Dioptrion lanterns using 250 watt H.P.M.V. Osram lamps are used. This installation covers approximately three miles, commencing at Buckhurst Hill, running through Epping Forest and Loughton.

THE GENERAL ELECTRIC COMPANY, LIMITED, MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

# Editorial

## *VEHICLES WITHOUT BATTERIES*

THE GREATEST casualty of this year's Budget is the electric vehicle. The imposition of a 33⅓% purchase tax is a blow which strikes not only at vehicle manufacturers but, perhaps more important, at the B.E.A.'s desire to increase off-peak consumption and the country's need to use home-produced fuel. It is true that on the credit side must be placed the increased petrol tax which provides a higher operational cost to its competitor, the petrol van, which also attracts the same percentage of purchase tax. The actual amount of tax to be paid, however, will be considerably greater in the case of electrics by reason of their higher initial cost and this must necessarily have an inhibiting effect on sales. There can be little doubt that these budgetary provisions were made without proper consideration of the particular circumstances of the electric vehicle. This is patent from the absurdity under which tax is charged on the battery where the vehicle is sold complete with battery and not so when sold separately. The obvious answer is to leave the purchaser to buy his own battery in all cases. Yet even this will leave the electric vehicle under the handicap of a penal purchase tax. Obviously this is a case on which representations should, and we believe will, be made to the Treasury. We wish them every success.

## *OIL, FOR WHAT PURPOSE?*

USERS of stationary oil engines must be congratulating themselves that the Chancellor has decided to confine the 9d. a gallon tax to oil for use on road transport. Had it been otherwise there would inevitably be some heartburnings, for as one of our recent articles showed, the economics of generation from oil engines is susceptible to variations of even as little as a penny a gallon. The intriguing thing about the new tax is that its imposition depends on the ultimate use to which the oil is to be put. On seeking an answer to the conundrum of how this classification is to be achieved, we learned from the Excise authorities that the decision to apply the tax or not on any particular consignment will depend on no more substantial basis than the user's intention at the time of delivery. While there is a legal dictum that a man's intention is as much a fact as the state of his digestion, it can hardly be said that either provides that degree of constancy which is an essential basis for sound taxation.

## *CANTEEN CALL*

ACCORDING to the Ministry of Food, the last decade has seen a considerable change in the eating habits of this country, two hundred million meals a week being now eaten away from home. The serving of so many meals entails a considerable amount of large-scale cooking. What is our industry doing to obtain its share of this load? It does not yet seem to be generally realised what a large proportion of commercial cooking is carried out in industrial canteens alone. Figures recently given by the *Economist* show that the number of industrial canteens has grown from a pre-war 1,500 odd to over 28,000, serving 15 million meals each week of the "meat and two veg." type and 54 million other meals. Even if a cup of tea and a sandwich represent a large proportion of the "other meals," the potential load can hardly be less than 13 million units a week or 650 million units a year. Estimates from a reliable source, however, show that the proportion of industrial canteens equipped with all-electric cooking is considerably less than 10%. To say that there is opportunity for expansion, therefore, is a masterly piece of understatement.

## *SALES SCHIZOPHRENIA*

CANTEEN cooking, with maximum demands not more than 50% of installed load, offers a useful load, particularly where it can be combined with off-peak water heating. It is, however, equally desirable to the gas and solid fuel industries, and we shall not get even a reasonable amount, let alone the lion's share, without a struggle. As in the case of the domestic cooker, the supply industry is suffering from split personality. One half, with an eye on the valleys, cries "Forward," while the other, with a wary eye on the peaks, cries "Back." One serious brake on the all-electric canteen, of course, is the load-spreading programme. If industrial consumers are to be directed to cut their maximum load by an arbitrary percentage, they will hardly be anxious to install electric cooking if it means limiting production in the factory. This fact might be emphasised when the Regional Boards for Industry consider next winter's programme.

## *NEVER TOO OLD TO LEARN*

WE ARE an imitative race, and more inclined to follow the ways of others than to take our own line in this country. Theoretical training is often discarded for the current practice when the shelter of the training class is left for the rougher company of established workmen. In view of this characteristic, some of the present enthusiasm for training apprentices and other new entrants in industry should be diverted to overcoming the problem presented by older men in industry. As Mr. Harvey, H.M. Electrical Inspector of Mines, points out in the report summarised on p. 685, an apprentice who sees a senior man successfully following some lazy practice will soon abandon precept for example, and this not only applies in terms of safety, but also to operational efficiency. There is for this reason the danger that money spent on training may be doubly lost. The remedy lies in close supervision backed by such educational schemes as are possible. Without them, a potentially valuable apprentice training scheme may fail.

## *SAFETY IN THE EARTH*

IN HIS report Mr. Harvey singles out the use of unscreened trailing cables for special adverse comment, and we have much sympathy with him in his feeling that he lacks support in his campaign to clear them from the mines. The tendency to rely on leakage trips that cannot possibly operate on the most likely faults, because there is no effective connection to earth, is yet another example of the average technician's failure to appreciate the principles of earthing as a safety precaution. In the usual domestic installation the presence of insulating surroundings protects many people who might otherwise be injured, but in the mine conditions are less kind. Most portable appliances are potentially dangerous and make advisable all possible safety precautions, the use of screened cables in mines is undoubtedly a matter of good practice.

## *TALKING WITHOUT THE BOOK*

FEW would belittle the important role which the ability to speak well in public plays in the career of a salesman or saleswoman, and the influence of the E.D.A. Public Speaking competitions in providing an incentive to proficiency has already been referred to in these columns. Mr. J. W. Thomas, B.E.A. Director of Training, recently made a suggestion that contestants should, instead of delivering a prepared speech on a set subject, be given a subject and required to speak impromptu for a certain minimum time. While this would raise the standard of speaking, it would enormously increase the difficulties involved, since many who can, by hard and painstaking rehearsal, appear accomplished speakers, make but a poor showing at extempore speaking. Some compromise might perhaps be effected, by which the extempore speech was additional to the "party piece." As well as raising the standard of competence this might provide additional pointers for the judges in difficult cases.

*Meteor*

# Estimating

## *for the Electrical Contractor*

### *Notes on overcoming the many difficulties involved*

by F. A. SCLATER

WHEN the Editor of the ELECTRICAL TIMES asked me to write an article on "Estimating", I rang up and explained to him that I was somewhat diffident as I felt that his readers would be full of expectations of finding an easy solution to one of their greatest problems and might feel very disappointed when they got to the end.

At the same time, I am sure that failure to estimate correctly is the main reason why so many young fellows who start up on their own come to grief after a short time.

If I spend £5 17s. 6d. on fishing tackle and go fishing for two days of eight hours, how many fish will I catch and what will be their total weight? That is the problem which the Editor has set me. Before answering it I have to ask him: Where will you fish? What is the depth and type of bottom? What is the weather? What previous experience have you?

Now there are many fishermen who already have the tackle and the experience who would be able to estimate their basketful fairly well before setting out, so the question is not really as silly as it sounds.

### *Fallacies*

Before starting operations, let us clear away some of the muckage! In the first place, I do not believe for one moment that the firm quoting the highest price is a bunch of get-rich-quick crooks. On the contrary, I believe that the lowest tender frequently includes the same or even more profit than the higher figure. In other words, the net cost of the higher figure bears a lower percentage of profit, although the profit in cash may be the same.

Another bit of muckage—let us face it!—is the idea that all electricians will produce the same results in the same period of time, in other words, that all men are equal.

Finally, let us appreciate that although two obs may be done to exactly the same specification, the one installation may be first-class and the other very poor; that is to say, workmanship cannot be covered by specification.

In my early days, people used to talk of "a pound a point" and it is surprising how the phrase is still used by architects' dogsbodies and others, but more of this later.

### *Inquiries*

Now the necessity for estimating arises from an inquiry which may take many forms, as for example:—

1. I note you consider our installation here should be re-wired. Please let us have an estimate of the cost.
2. Herewith sets of plans of No. 38 Cambridge Place, W.1, which is being converted into six flats. Please mark the plans with the points you suggest and return them with your estimate.
3. Please let me have your lowest price for 90 lights and 21 heater points at 38 Cam-

bridge Place, W.1. The work should be carried out in steel conduit with flush switches, bronze finish. The house may be converted into six flats.

4. As consulting engineers to the Sclater Trust, we have been instructed to invite you to tender for the proposed electrical installation at 38 Cambridge Place, W.1. Specification (20 pages) and a set of plans are enclosed. Tenders should be forwarded in a sealed envelope marked "Sclater Trust" to arrive not later than the first post on the 20th inst.

There can be many variants of the above examples of an inquiry but only in the case of No. 4 can you settle down and start to work out a figure. In all the others, questions of policy must first be considered.

In No. 1, obviously the customer trusts you implicitly and you must give him a good, sound job at the right price. You might even suggest the time and material basis, using the percentages approved by the War Damage Commission.

No. 2 gives you the greatest possible freedom of action but there would seem to be a possibility that your scheme may be copied and other prices obtained on it.

No. 3 is just stupid but a very common form of inquiry.

As we know, "steel tube" may cover several styles of wiring, including the best and the worst, and "lowest price" is an ominous phrase which is almost an invitation for dirty work. The last sentence appears almost to be an afterthought, but to make provision for the possibility will entail quite an additional cost.

### *Architects*

It is a sad fact that architects (speaking generally) appear to regard the electrical contractor as a very low form of life and when savings have to be made it is generally the electrical installation that suffers first. The trouble is that when a plumber does a bad job the pipes leak and everybody knows about it, but very often the electrician could do the job in bell wire and no one would be any the wiser. It would seem that even today the "electrician" can get away with almost anything and it is for that reason that reputable firms of contractors should never quote a figure that does not allow for a sound and thoroughly workmanlike job.

A good reputation is far more valuable than £100 extra profit on a particular job.

Before starting to estimate, a number of considerations arise and among them are the following:—

(*a*) If the premises are existing, will a builder be at work at the same time; if so, are you to be a sub-contractor? If yes, then do not forget to add 1/39th to your total to cover builders' discount. Will the builder do all the "cutting away and making good," including lifting and replacing floorboards, chasing walls, etc.? If so, your labour figure should make due allowance for this.

(*b*) If it is a new building, then you are certain to have a sub-contract and must cover builders' discount. Find out all you can about the type of construction, such as concrete floors, hollow tile ditto and anything else which is likely to affect your costs.

(*c*) Is there proper provision on the plans for your main switchgear? We have known blocks of flats where we were expected to fit all the service arrangements in a little cupboard under the stairs. In such restricted positions the work takes twice as long.

(*d*) Other questions to be considered are scaffolding, storage of material and transport facilities. These all make a difference.

(*e*) A very material factor is whether you have any previous experience of the parties with whom you will have to deal. Sometimes a job is set out before starting and goes steadily through to completion. Other people make constant alterations and it is almost impossible to claim additional variation orders for all of them.

(*f*) Does it look as though the work can proceed steadily from start to finish or will you have to keep taking the men away and then sending them back after a few weeks?

Having made up your mind on the foregoing points and others which will doubtless occur to you, the next stage would seem to be to make a calculation of the load and from the total connected load deduct suitable figures for diversity on which, generally speaking, for domestic purposes the I.E.E. rules form a good guide.

The next move is certainly to draw a sketch of the service and distribution arrangements showing the main switches, bus-bar chamber, if any, and sub-mains, and mark on the sketch the rating of the switches, size of conduits and cables and all other particulars.

If a full consulting engineers' specification is supplied, then all this is decided for you and if not, it is essential to design the layout of the job before you start to estimate what it will cost.

First settle the type of wiring which you are going to put forward—screwed conduit, tough rubber, metal-sheathed cable or what-

not. The next stage depends very much on whether you have a complete plan of the building with the points marked or whether it is an existing building and you merely have a schedule of points. If you have a plan, you can lay out the wiring and measure exactly how much conduit, cable and so on will be required and if the building is large you will no doubt take a definite section, say one-eighth, and use this as a basis, multiplying your result by eight. The snags in this procedure are obvious but on the other hand it is a great time-saver and, generally speaking—taking the rough with the smooth—works out fairly well.

At this stage you can start to make a list of the material required and by far the best plan is to do this on the sheets of a loose-leaf ledger.

### *Labour*

You then reach the most difficult point of all, when you have to calculate the number of man-hours required to do the job. No one can tell you how to do this and it is clear that this is where your experience comes in and brings us to the point of the most important book which any firm can keep.

The cost book and the cost accountant are the most material factors in the success or failure of the financial side of a business and any firm which tries to economise by neglecting the careful costing of any job it carries out is asking for trouble.

Now I enjoy messing about in boats, but I know men who spend so much time scraping, painting, splicing and overhauling generally that they never get to sea—others there are who repair all defects with a lashing or a piece of wire and sooner or later they have to set fire to their shirts to call the lifeboat.

All matters are a compromise. The cost of your "costing" is part of your overhead expenses, every job bears its proportion and your profits are reduced by the amount you spend but in my view accurate costing is far more valuable to a firm, within limits, than the sum actually expended.

Costing is best done in a loose-leaf ledger and at the completion of any job an analysis should be made which provides the following information:—

Address, Architect (if any), date started, date completed.
Name of Foreman, type of building.
Total number of points, lighting, heating power.
Total quantities of materials.
Average lengths of conduit, wire, etc., i.e. totals, divided by the number of points.
Cost of conduit, wire, accessories and labour per point.

There are other matters of interest but with the minimum information given for, say, a dozen different jobs, the estimator has solid ground on which to work.

What I always call the "density" of installations varies considerably. By this I mean that one room 40 ft by 12 ft may have 3 ceiling points and another room of the same size may have 20 wall brackets and this is where the fallacy of "a pound a point" comes in, i.e. the length of run per point for the 3 points is obviously greater than for 20 points covering the same area. All this, however, can easily be covered by the estimator who has the analysis of previous jobs before him.

After this visit to the costing department, we return to our list of material required and we can either put in labour as a total number of man-hours or we can let each item of material bear an appropriate sum to cover labour.

In the case of new buildings or factories with long, straight runs, the latter method is much the easier.

By this time you should be able to tot up the various sections and arrive at what you consider to be the net cost of each, such as:—

Intake.
Submain distribution.
(*a*) Lighting.
(*b*) Heating.
(*c*) Power single-phase.
(*d*) Power three-phase.
Circuit wiring a, b, c, d above.
Special items such as consumer units for a block of flats.
Isolators for motors.
Thermostats for heating.
Cooker control units, etc., etc.

### *Overheads*

Now comes the question of overhead costs for which allowance should be made. The total of last year's overheads such as rent, rates, telephone, stationery, etc., also office staff, can be taken from last year's accounts and this can be worked out as a percentage of your total sales, but if you had a good year the percentage will be lower than if you were not working to capacity. Again your total sales will have been made up of goods which you merely bought and sold again with little effort and also of labour and material for wiring which has meant hard slogging all the time and greater overhead cost.

This question of overhead costs is not a simple one. If you are your own employer, naturally your drawings do not enter your over-

head costs, or such items as directors' fees in the case of a limited company. On the other hand, travelling expenses—whoever may incur them—should be included.

Having arrived at an average figure, preferably over a number of years, you can then adjust the percentage slightly to make it "costs" instead of "sales" and add the correct proportion to the estimated cost of the job.

## *Profit*

Having now determined what you anticipate the job will cost, all that remains is to add for profit. Whether you add a single percentage or whether you take a higher percentage on labour and a lower one on materials is really a matter of choice. The more certain you are that the costing is correct, the lower the percentage which can be added safely for profit.

There was an agreement between the Chartered Surveyors' Institution and the National Federated Electrical Association before the war in respect of charges for day work and this agreement was as follows:—

1. In respect of labour—the prime cost, to which 33⅓% is to be added. In ascertaining this prime cost, the time of the charge hand electrician is to be included, and overtime (if any) to be charged on basis of the agreement with the Electrical Trades Union in force for the time being—time and a half or double time as the case may be.
   Out allowances and fares (town and country), dirty money and out-of-pocket expenses to have 15% added.
2. In respect of materials (excluding specially designed or price maintained articles, lamps, domestic appliances, fittings, etc.) net trade prices, as invoiced to the electrical contractor, plus carriage, to which 20% is to be added.
3. The above percentages are to be held to include all insurances, use and repair of ordinary hand tools and tackle, general establishment charges and profit. They are also to include, where applicable, the payment by the electrical contractor of 2½% cash discount to the general contractor. These rates do not apply to jobbing work.

Now the above percentages hinge on the expression "day work" and imply that no fixed sum has been agreed between the purchaser and the electrical firm. The purchaser expects a good job at reasonable cost and the firm should get a reasonable profit without taking any financial risk, but the arrangement is very rough and ready.

Keen tendering which is required to deal with nearly all inquiries demands vigilant care in all its stages beginning with the costing records.

There is a point which puzzles me and leads me to think that in many firms the costing department is not given the attention it deserves, and the reason is this—frequently, when tendering, contractors are asked to provide schedule rates to be used for variations during the progress of a contract and when these schedule rates are examined, it is often found that the firm tendering the lowest figure is higher in price item by item.

An example came to my notice recently; the rates per foot for ¾ in. conduit fixed complete were quoted by five firms, as follows:—

Firm A—1s. 2d. Firm B—2s. 4½d. Firm C—1s. 5d. Firm D—1s. Firm E—8d. and yet in the total tender Firm B was lowest with Firm A as runner-up.

The reason for this discrepancy can only be due, as I see it, to lack of accurate costing analysis in which case estimating can only be very haphazard, which is why so many young fellows come to grief; but surely this is where we came in.

In view of this it is felt that a careful study of all the ideas and suggestions set out in the foregoing should prove of considerable value.

## *Conclusions*

The man who first printed "Estimates Free" at the top of his notepaper created a very heavy charge on industry.

Wide variations in tender prices, whether they are for electrical installations, battleships or printing a leaflet, are common knowledge, and on the face of it one would suppose that the firm quoting the highest figure would never get any work and soon go out of business; this, however, is not so and the reason for the variation in tenders must be sought elsewhere.

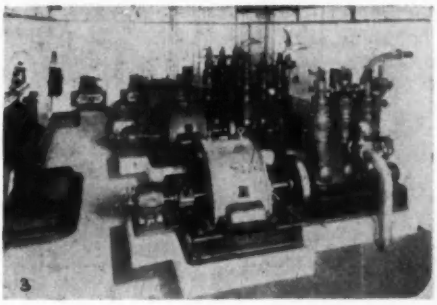
There is probably a number of different reasons. One is certainly that firms cannot help to some extent specialising in the class of installation they carry out or ship which they build. Another is that a firm may be so busy they cannot see their way to handle the job and therefore quote a high figure. *Au contraire*, they may be very anxious to make contact with the purchaser in view of future business which may result. Then there are new estimators who are not fully experienced in what is really required.

The truth is that estimating and tendering is rather a dreary job and a very exacting one if it is done properly. If it is not done properly you run the risk of losing money which is almost the only easy thing for us to do nowadays.

# Our readers' views ...

## Newton Abbot Station

YOUR illustration of the above station prompts me to send you a picture I took of the original Torquay plant when I was arc lamps attendant there in 1898. The works were in a



coal cellar on Beacon Quay and comprised three Willans-Fynn sets each 150 kW with three Ferranti rectifiers for the street arcs. This plant was in service for at least 10 years. I think that a plaque should be erected on the wall of the coal-cellar, which still exists, to mark the site of the genesis of the Torquay undertaking, of which the fine Newton Abbot power station is the outcome.

*W. E. Warrilow,*
M.I.E.E.

BOURNEMOUTH

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## Commercial Engineers

"CARRY ON," in his letter of your issue of the 6th April, is under considerable misapprehension of the duties of a consumers' engineer. It is the first time I knew that the duties were only "sales of apparatus and quick profits," and I invite "Carry On" to spend a day in my office when he would have the chance of settling many of the highly technical problems that arise. Believe me, "Carry On," the consumers' engineer is a vital cog in the machine and equally as important as the distribution engineer; each has a job to do and it is only by perfect understanding and co-operation between the two that we shall justify our existence. Perhaps a census of "consumers' engineers" occupying these positions would prove to "Carry On" just how many were engineers. For his information I have occupied the positions of distribution engineer and consumers' engineer. I am now a sales superintendent but trust I remain an engineer and a member of E.P.E.A. I am not interested in the argument that a consumers' engineer is one grade lower in the schedule than a distribution engineer. I submit my name willingly.

*T. W. Rice*

MANCHESTER

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THERE is great dissatisfaction over the new N.J.B. schedules, particularly the various provisos for certain grades and the low salaries in general.

Engineers on the commercial side were obviously poorly represented by the E.P.E.A., who in their endeavour to please the mains staffs have sacrificed the consumers' engineers.

Grade 1 should have been pressed for all District Engineers and District Commercial Officers, and in support of this I might say that before nationalisation the total of salaries paid to the three chief officials in my district was £4,400, compared on the new set-up with two officers £1,830 total!

This comparison of duties has become a "red-herring" tending to let staffs lose sight of the poor salary value in general. Both the E.P.E.A. and the B.E.A. have made little or no allowance for present-day values—is it not an insult to place engineers in control of large undertakings at salaries equal to about £375 per annum prewar?

*A.M.I.E.E.*

LONDON.

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## Multiway 13A Sockets

IN your issue of April 6, "Megohm" deprecates the use of adaptors. In a general way, so did everybody else, including my company. When "Post-War Building Studies No. 11" was published, providing for a considerable increase in the number of socket outlets in place of two or three, most people thought that the use of adaptors could be eliminated. Anything up to 10 to 14 socket outlets was thought to be possible without undue increase in the cost of wiring and accessories, by using ring circuits. In practice, nothing like this number is being

installed in the majority of post-war houses. "Megohm's" idea of installing two or three sockets side by side is a counsel of perfection, and never likely to be adopted in houses of the Council type.

What happens in real life is that a socket outlet is provided for the electric fire in the living room, apart from three to five outlets in other parts of the house. When the tenant moves in he is able to use an electric fire fed from the socket outlet provided for this purpose. The next thing he wants to do is to use a standard lamp and a wireless set and/or an electric clock from the same point. The only practicable way of doing this is to use an adaptor. Similarly, it is sometimes desired to use an electric kettle, and possibly an electric clock, in the main bedroom in addition to an electric fire. Here again the adaptor intrudes.

The result of all this is that although we set our faces against the provision of adaptors when we, as pioneers, introduced the D.S. 3 kW all-purpose fused plug, we found that the public demand for adaptors forced us to realise that *vox populi vox dei.*

*R. Amberton*
*Director*
DORMAN & SMITH LTD.

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## Cossipore

IN the article on page 193 of the issue dated February 9, 1950, the sub-heading "New Station at Calcutta adds 110 MW to Pakistan Resources," requires correction, as Calcutta is not in Pakistan.

*R. N. Batra*
*Executive Engineer, Distribution*
P.W.D. PUNJAB
[*We apologise for the error.*—ED.]

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## Deptford in the Nineties

I AM obliged to Mr. E. H. Jesty for drawing my attention to the late Sir A. Fleming's I.E.E. paper of 1891, but this has nothing to do with the design of the Deptford alternators. It is entitled, "On some effects of alternating current flow," and about half of it relates to experiments carried out in 1891 on 11½ miles of the L.E.S. Co.'s trunk mains for the purpose of (a) measuring their electrostatic capacity, and (b) throwing light on the pressure rises which were an unpleasant feature of the operation of the undertaking. For these experiments No. 2 generator was placed at Dr. Fleming's disposal and it was run at various excitations to give 1,104 to 2,568 volts which were stepped-up to 4,416-10,272 for the purpose of the experiments. The frequency was assumed to be 67 c/s because "unfortunately the speeds of the dynamo were not taken." Nowhere (in my copy of *Journal I.E.E.* Vol. 20) can I find Mr. Jesty's figures of 83 cycles and 52 r.p.m., and it is safe to say that no generator at Deptford ever ran in commercial service at such an abnormal speed.

The two rope-driven alternators of 100 amperes 10,000 volts at 208 r.p.m. referred to in my letter under the above heading were not the only generators at work in the Deptford Station in 1889-90, for it is on record that at the beginning a (transformed) supply was given by a rope-driven Siemens-type alternator of *ca* 170 amperes 2,500 volts removed from the Grosvenor Station of the Company. There were also (in 1890-91) two rope-driven sets rated at 200 amperes 2,400 volts for light-load work, while later on the plant was extended with 10,000 volt and 2,400 volt direct-coupled sets of various outputs.

*A. C. Eborall*
LONDON

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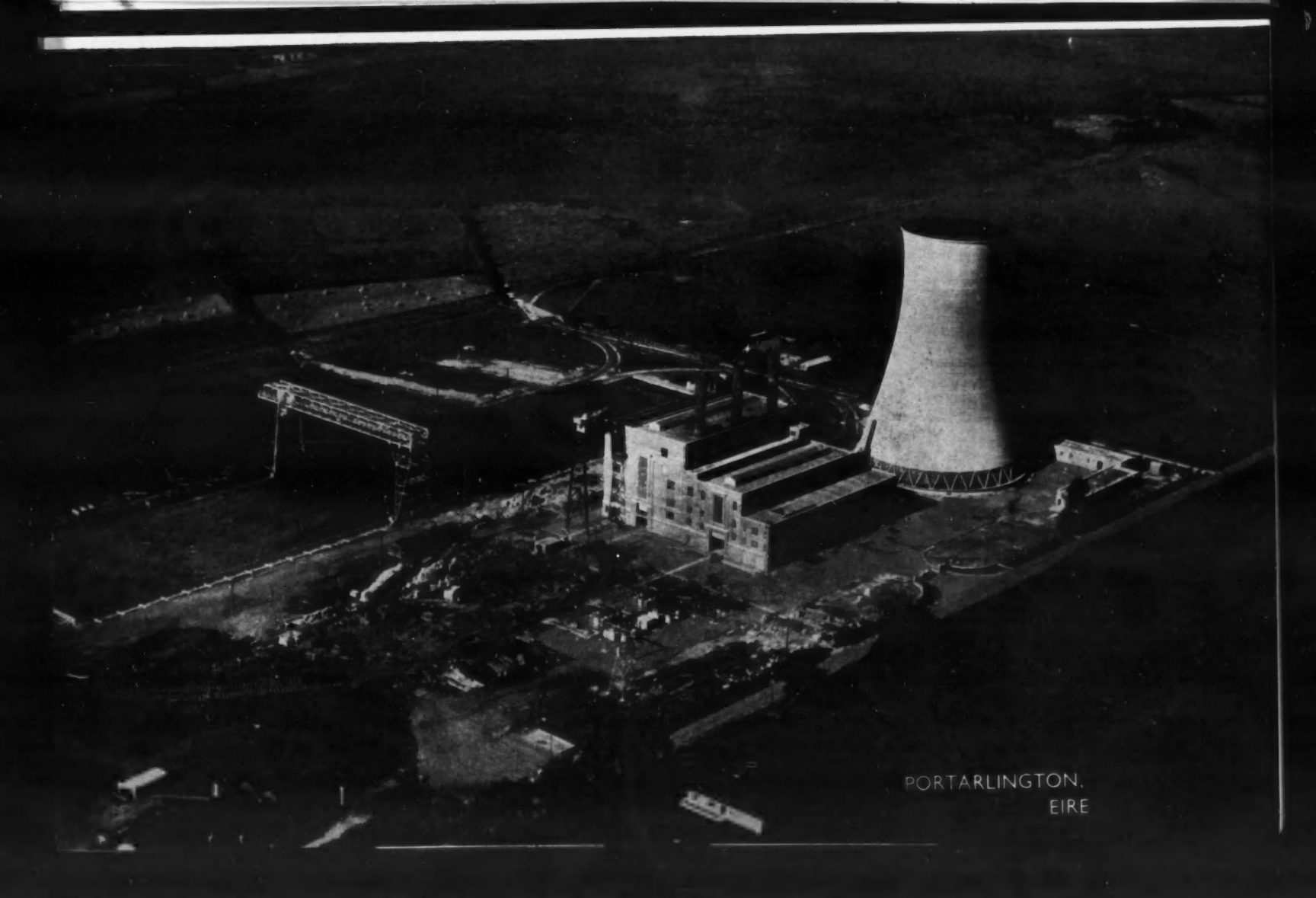
## False Security

SOME months ago I advised a friend of mine to call in an electrical contractor to replace all two-pin plugs over conducting floors in his house by three-pin switchplugs which, of course, would provide an earth conductor. This work was carried out, all new switchplugs being earthed correctly to the rising water main.

Recently my friend complained of the smell of burning rubber in the cable attached to an electric iron, so I decided to inspect the electrical connections in the plug top and to my amazement I discovered that the electrical contractor had fitted a three-pin plug top, but used the existing *twin* core flex which, of course, provided no earth conductor.

Although this had nothing to do with the smell of burning rubber, it very clearly indicates that the public, who may be ignorant of the possibilities of electric shock, cannot rely on certain electrical contractors to advise them of the dangers or provide safe electrical installations.

*Chartered Electrical Engineer*
BIRMINGHAM


PORTARLINGTON.
EIRE

# A Turf-Fired Power Station

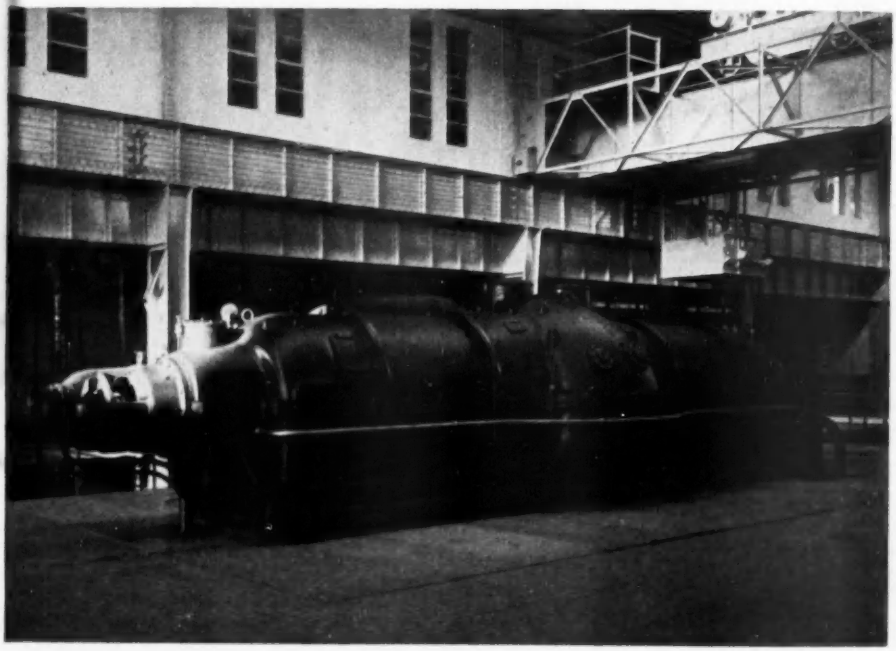
## *Some details of the system adopted at Portarlington, Co. Leix, Eire*

THE Electricity Supply Board of Ireland, in pursuance of its policy of exploiting, as far as possible, the natural resources of the country for electricity generation, decided, some time ago, to proceed with the erection of a power station designed to utilise the abundant peat resources of Clonsast bog. This bog is about 4,000 acres in area, and is situated four miles north of Portarlington. Special turf-winning machinery has been installed, capable of removing in an average year 120,000 tons of turf, all of which is destined to be consumed in the power station, which has now been erected, and which was officially inaugurated by Mr. Daniel T. Morrissey on Monday of last week.

The station is located on the north bank of the River Barrow, about a quarter of a mile outside the town of Portarlington, and occupies a site of about thirty acres. A general view of the site is shown in the aerial view accompanying this article. The boiler plant, turbine house, control room and general offices are housed in the main building on the left of the 236-ft high cooling tower. Behind the power house and straddled by a bridge crane is the fuel store, capable of holding 40,000 tons of turf. A single track narrow-gauge railway circling the fuel store and passing between it and the main building connects the station with Clonsast bog and, in addition, a full gauge siding allows rail access to the Portarlington-Athlone branch line.

### *Fuel Handling*

The turf, which prior to transportation to the station is air dried, is delivered in steel trucks, each holding five tons of fuel. On arrival, the turf is weighed and samples taken for analysis of calorific value and ash and moisture content. It is then either fed directly to the boiler-house bunkers or stock-piled in the fuel compound for future use. In the latter case, the contents of the trucks are unloaded in any part



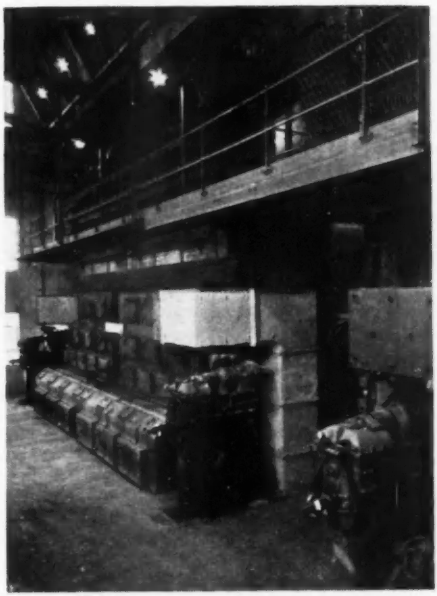
*The A.S.E.A. Ljungstrom type steam turbo-alternator installed in the new power station at Portarlington*

of the 12,500 sq yd storage area by means of the 8-ton electric bridge crane. This lifts each full truck off its bogie, carries it to the required area, tilts the truck to allow a hinged door at the end to open automatically and thus discharges the turf. The truck is then returned and replaced on its bogie. Should the fuel be required for the boiler-house bunkers, the turf trucks are run up to the boiler-house and unloaded in a similar manner by two jib cranes on the roof of the boiler-house. The turf is discharged into one of the three bunkers which serve the three boilers immediately under them. Each bunker has a capacity of 300 tons.

Owing to the high moisture content of the peat, arrangements have been made for a certain amount of pre-drying before combustion. From the hoppers the peat descends to the combustion chamber of the furnace through a vertical drying shaft through which hot air is blown.

The turf enters the combustion chamber and passes on to a chain grate stoker in the normal manner. It is remarkable that the ash clinkers in the same manner as with coal burning. This ash is crushed, removed mechanically to an ash disposal plant, and transported from the site by rail wagon.

The boilers, rated at 150,000 lb of steam per hour, operate at 450 lb/sq in. superheated to 825° F. Each boiler has an output sufficient to feed one turbo generator set, of which two are installed, each rated at 15,600 kW maximum output.



*Front of boiler unit showing drying shaft and combustion chamber of boiler*

## *Generating Plant*

The generating plant comprises two 12,500 kW m.e.r. Ljungstrom type turbo-alternators running at 3,000 r.p.m., the generating voltage being 10 kV. Cooling water at the rate of 12,500 gallons/min are required for each set. On full load this amounts to 18 million gallons per day, which is beyond the capacity of the River Barrow. In consequence it has been found necessary to erect a single cooling tower and rely on the River Barrow for make-up only.

The output of the generators is taken through circuit-breakers to the 10 kV station busbars located in the main building. From these bars two 2,000 kVA step-down transformers take a supply for the power station auxiliaries. The main supply is conveyed via underground cables to two 20,000 kVA step-up transformers, 10 kV/110 kV, for main distribution. On the h.t. side of these transformers are the main circuit-breakers, rated at 600 amps, 1,250 MVA, connecting the station through a 12-mile long transmission line to the central transmission system at Portlaoighise. These breakers are of the low oil-content type and are compressed air-operated.

## *Costs*

When completed with a plant capacity of 25,000 kW, the capital cost of construction is estimated to be in the region of £1,280,000, giving a cost per kW of £51·2. The estimated turf consumption will be 120,000 tons per annum, and with a consumption of 3·0 lb per unit generated the annual unit output will be about 90 million kWh. With a price of 39s. 6d. per ton of turf the fuel cost per unit generated works out at 0·635d. When interest, depreciation, maintenance repairs, etc., estimated at 0·393d./unit, are added to this, the total production cost per unit will be about 1·028d. assuming a peat calorific value of 6,200 B.T.U./lb.

MAIN CONTRACTORS

| | |
|---|---|
| Boiler plant | Babcock and Wilcox Ltd., London |
| Turbo-alternators, Transformers, Switchgear | A.S.E.A. Electric Ltd., London. |
| Structural steelwork | Chapman and Co., Belfast. |
| Buildings, Cooling tower | Irish Engineering and Harbour Construction Co., Dublin. |
| Turf store crane, Engine-room crane | Sir William Arrol Ltd., Glasgow. |
| Boiler-house cranes | Oerlikon Ltd., London. |

# E.D.A's Encouraging Report

## Review of Increasing Activities

THE year 1949, for the Electrical Development Association, was one of considerable importance, judging by the annual report presented at the general meeting last Friday. Although development was still under a cloud, it being necessary for a time to emphasise the need for electrical economy, some of the restrictions were discarded after a strong effort, and the Association is able to report encouraging progress. It is pointed out that the continued existence of a more than active E.D.A. is evidence that the day must come when the power load can be doubled, the lighting load trebled, and the domestic load quadrupled. It is, of course, only by instilling the electrical idea into the minds of the British public that this will be achieved, and this is the goal at which E.D.A. continues to aim.

### Changes

The Association again assisted the Area Boards in various ways. The reconstituted Area Committees established subsequent to vesting day continued to operate, although certain changes took place. Following consideration by the B.E.A. and the Area Boards of the manner in which the work of E.D.A. could be most effectively carried out, it was decided that the Area Boards should accept the responsibility of providing some machinery within their areas for liaison with the E.D.A. Council and dealing with the Association's matters locally. In a number of instances the Boards have appointed an officer to deal with these activities. The North of Scotland H.E. Board, however, while appointing an officer to act as liaison with E.D.A., preferred to utilise its own organisation for dealing with any matters which might arise. But in Northern Ireland, the committee continues to function. As a result of this decision, all the Association's area committees, with the exception of the North Eastern and Northern Ireland, were dissolved last year.

The Council of E.D.A. has again expressed the opinion that it was desirable for provision to be made for representation of the Generating Divisions of the B.E.A.

### Publicity Work

In the Association's press drive, a new series of advertisements began appearing in 44 national newspapers and magazines last May. These had the object of drawing attention to the national importance of electricity and propagating a wider knowledge of its latest applications. Considerable help has been given to editors of the women's journals, and following representations to the B.B.C. at Alexandra Palace concerning the scant attention given to electricity and electrical appliances, the position as regards television programmes was improved.

### Films

During the course of the year under review, a record number of films was made, and such was the demand that it was found that fifty copies of a single film were barely sufficient to cover requirements (the pre-war demand averaged only four); the demand during 1949 increased by 90% over the previous year, a total of 5,458 films being circulated, in addition to those purchased by the Area Boards. Many copies of films were also sent abroad. The Council has authorised the production in Technicolor of the first of a series of cookery demonstration films featuring Mr. Philip Harben. This should be ready for issue shortly. Three films for farms and farm workers are also in the final stages of production.

The Association continued its support of the well-known exhibitions, and assisted the Area Boards in the matter of display material, etc.

### Commercial Development

The considerable activity of the Association in commercial development matters is dealt with at some length in the report, the items ranging from efforts to reduce purchase tax on water heaters and other items (on which the Association and the public has been sadly disappointed), to street lighting and trolley buses. In regard to the latter, in view of the industry being faced with the problem of retaining the existing load, it has been agreed to re-establish the special committee.

To assist Area Boards' staffs and others, a handbook is being prepared on the maintenance of domestic refrigerators. In connection with rural electrification, a committee has considered a scheme for mobile electro-agricultural exhibits to facilitate the extension of practical demonstrations, and has recommended the provision of prototypes.

The year has also been a busy one for the Association's Testing House staff, the present accommodation becoming inadequate. With new development in mind, considerable extension is anticipated, and steps are being taken to provide more suitable accommodation. Following an investigation into the testing facilities provided by Area Boards, the Testing House Committee prepared a standard form to promote uniformity in methods of testing, covering kettles, irons, vacuum cleaners and cookers; others covering additional appliances are in course of preparation.

# Problems and Practice

## IN ENGINEERING

### *Screwdriver Danger*

WE were recently asked to "see to" fuses controlling various portable small tool switch socket circuits. The electrician's first operation was to test the sockets by means of a small screwdriver incorporating a neon indicator lamp; at the sixth socket tested, a blinding flash occurred as the test screwdriver was entered into the "live" socket. This resulted in bad flash burns on the hand holding the test screwdriver and necessitated the electrician going to hospital.

Upon investigation, it was found that a number of the switch sockets, a popular reputable make, had serious tracking across the insulating disc which covers the actual sockets. Upon the insertion of the test screwdriver which, of necessity, made contact with the tracked surface of the insulating disc, the voltage flashed across to the centre "earthed" fixing screw.

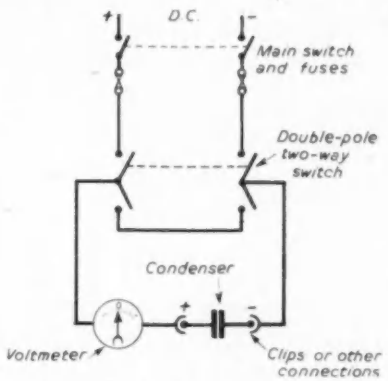
The original cause of the fault was proved to be a "tracked" three-pin plug on a grinding machine which had been tried out on various switch sockets. It is now standard practice to visually check "plastics" for signs of tracking before inserting any test equipment into socket apertures.—*T. A. P.*

### *Electrolytic Condenser Checking*

IN many small d.c. contactor installations an electrolytic condenser is connected across the contactor operating coil to prevent excessive induced voltage across the coil on its circuit being broken when the contactor is opened. The checking of the soundness of such condensers should be part of the routine maintenance programme, and if there are large numbers a quick way proves of value.

The circuit shown in the accompanying sketch was found useful for this purpose. A double-pole two-way knife-type switch is connected so that the condenser may be either supplied from normal-voltage d.c. mains (through fuses), left open-circuited (when the switch is in the mid-position), or discharged. In the condenser circuit is a centre-zero voltmeter. For convenience in use the condenser leads may terminate in U-clips, as for cylindrical condensers, crocodile clips, or other suitable connections.

A condenser to be checked is connected to the circuit, with due regard to polarity, and the switch moved to the d.c. supply side. The condenser will be charged and the voltmeter needle will kick one way. After a short time the meter needle will take up a non-zero position, the small final deflection being a measure




*Schematic of condenser testing circuit*

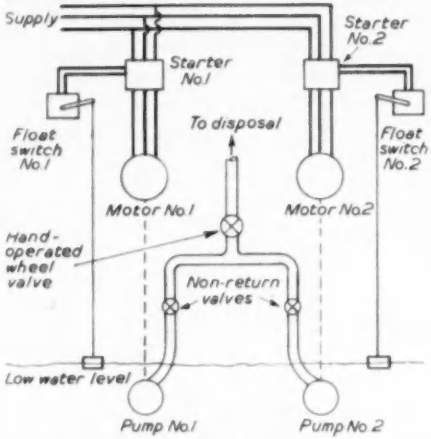
of the insulation resistance of the condenser at normal voltage. The switch is then reversed smartly, and the condenser discharged through the voltmeter resistance. The voltmeter needle will then kick the other way, and the magnitude of its throw will be a measure of the capacity of the condenser.

Limits for acceptance of condensers checked in this way can be found by applying the test to several condensers of the type used which are known to be sound. All condensers giving appreciably more leakage deflection or less discharge throw of the needle can then be regarded as unsound and requiring renewal.—*B. J. P.*

### *Pumps in Parallel*

WHILST working on an army camp in Cheshire I was called upon to attend to some newly installed drainage pumps which had stopped working. A heavy rainstorm was in progress and there was danger of flooding. The pumps (two in number) were of the centrifugal type and situated at the bottom of a

20 ft deep tank into which all the camp drains emptied. The drive was provided by two flange mounted motors in the motor room above via long vertical shafts, and each motor had its own push button starter and float switch control. The pipe and electrical layouts were as shown in the accompanying diagram. On inspection, all fuses were found to be in order, and the




*Pipe connections of drainage pumps*

pumps were re-started simply by pressing the starter "reset" and "start" buttons. The pumps then ran perfectly until the following day, when the trouble recurred.

Various theories were put forward, including faulty motors, faulty starters, wrong overload setting, and all the usual things—always, of course, blaming the electrical apparatus. However, after checking thoroughly, I decided that the electrical part of the installation was in perfect order, and on a dry day I stayed in the motor room until the pumps emptied the tank and were shut off by the float switches. The cause of the trouble then immediately became apparent. Both pumps ran together until cutting off point was reached (this being with the pumps just submerged in the water for priming purposes). Then one pump cut out (it is very difficult to adjust two float switches to operate at precisely the same moment). The non-return valve for this pump was sticking open, and the second pump was just lifting water about 3 ft for it to run back into the tank again through the stationary pump. This, of course, overloaded the pump still running and the trip operated. With both pumps stopped the water began to rise and the first pump was started by its float switch, but as both non-return valves were sticking, this pump, too, was overloaded in the same manner and consequently, cut out. With both pumps thus out of action the water was allowed to fill the tank and overflow.—*J. Garside.*

### *Accelerated Heating*

A STRANGE fault that occurred at a friend's home recently was that an electric kettle he has, normally takes eight minutes to boil. On putting it on one morning he was greatly amazed to find it boiling two minutes after he had switched on. On investigation I found that there were two elements in series for heating and that the neutral feeding the elements had shorted on to the case of the kettle, cutting one of the elements out but feeding the other one through the case of the kettle. To boil the kettle in two minutes the one element had its current doubled, and therefore as heat is to the square of the current the kettle would boil in a quarter of the previous time, which is two minutes.—*C. B.*

### *Motor Start with Broken Phase*

ONE line contact had come adrift from a small 3-phase contactor starter so that the phase concerned was open circuited. The motor was clearly "single phasing," but apart

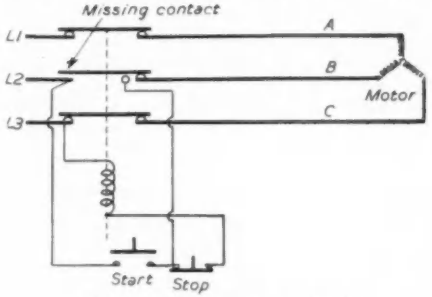



*Diagram of motor starter circuit*

from that it worked normally, running up to speed with its usual starting torque when the "start" push button was pressed.

The explanation proved to be that the motor starting current in phase B was passing through the "start" push button contact to the auxiliary contact on the outgoing side of the contactor, and via the main contact to the motor phase B. When the push button was released the supply to phase B was broken, but the contactor coil remained energised at a reduced voltage, its current returning to line 1 through the motor windings B and A instead of through the missing contact to line 2.—*V. M.*

# ELECTRICITY IN MINING

## *Chief Inspector's Report Shows Increased Application*

ELECTRICITY continues to be used more and more in mining, and the Report* of H.M. Electrical Inspector of Mines (Mr. G. M. Harvey) for the year 1948 gives the horsepower of electric motors used on the surface as 1,266,840 (34,581 machines) and, underground, 1,581,646 h.p. (49,963 machines). These figures show an overall increase of 3·4% in rating and 5·4% in number. During the year there were three fatal accidents attributed to electrical causes, and 61 non-fatal accidents and dangerous occurrences.

### *Last Year*

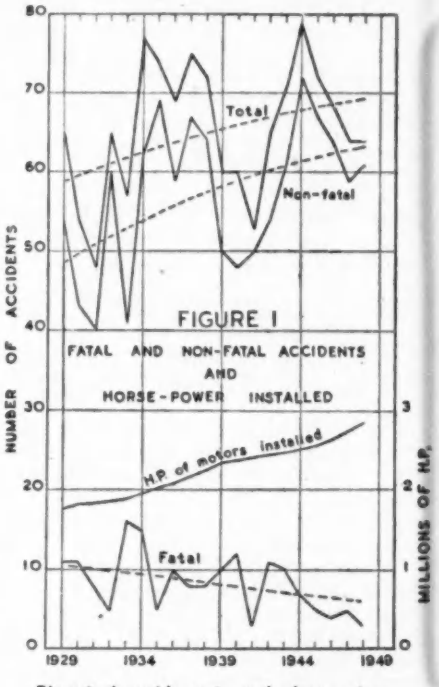
One person was killed in each of the fatal accidents, and in two of these the use of unscreened four-core trailing cable was the direct cause of the trouble. There was, indeed, a remarkable similarity between the two occurrences, for in both cases men were moving conveyor pans to extend a conveyor, and the edges of the pans cut into the cable and made contact with the live cores. Earth leakage protection was correctly provided, but in the absence of direct connection to earth failed to operate.

The third fatality resulted from burns received when firedamp was ignited by a faulty electrically driven fan. The arc which caused the explosion occurred in a broken bolted plug and socket connecting the supply cable to the fan motor, a fault on the starter being a contributory factor.

More electrical accidents, fatal and non-fatal, resulted from the use of unscreened trailing cables, than from any other single cause. In addition to the two cases described above, there were 11 non-fatal shock accidents and two fires arising from this cause. In this respect, Mr. Harvey records that in the ten years beginning 1939, there have been 100 shock accidents involving unscreened trailing cables, 4 ignitions of firedamp, and 30 fires. "Every year of those ten," he continues, "I have stressed the folly of refusing to adopt screened cables and earth leakage protection which have proved so successful in preventing accidents, and it is disheartening to find that I have been a voice crying in the wilderness."

*"*Report of H.M. Electrical Inspector of Mines for the Year* 1948." *H.M. Stationery Office, price 6d.*

Eight non-fatal accidents are selected for description in the report, and two of these illustrate the steps taken by workers to interfere with devices included for their own protection. In one case an earth leakage trip had been jammed by a piece of stone forced behind the reset button, and in the other an earth leakage trip was reset without the fault




*Electrical accidents in and about mines*

causing it being rectified, the men concerned taking the trouble to detach the appropriate locking device by removing a nut, in order to do this.

### *Two Decades*

After his review of the year's workings, Mr. Harvey proceeds to an analysis of electrical accidents which have occurred in the last twenty years. The overall trend is shown in his Figure 1, which we reproduce, and as can be seen, the total number of accidents/year seems

to be increasing at a progressively slower rate, although the rise in the total h.p. installed continues unabated. A 62·5% increase in motor rating has involved only a 17% rise in the number of accidents.

An investigation into contributory causes of accidents shows misuse, negligence and ignorance as the most generally present trouble, with faulty installation and maintenance causing trouble in about half as many cases. Other causes analysed were bad design or unsuitability and poor organisation or lack of equipment.

Turning to the type of apparatus involved in accidents, it is found that trailing cables and plugs were responsible for 45% of the fatal and 35% of the non-fatal accidents, while the corresponding percentages for switchgear and fuses are 22% and 45%. Unarmoured cables, armoured cables and accessories and motors and transformers come next in the list of causes of non-fatal accidents, with much smaller percentages. The report emphasises that in the case of switchgear the accident is not generally due to the design or unsuitability of the apparatus, but to the carelessness or foolhardiness of the person engaged in repairing or adjusting it.

When the type of worker involved in accidents is investigated, it is found, as perhaps would be expected, that electricians form the greatest single class, being 32% of the total. Moreover, the number injured has increased fairly steadily from 11 in 1929 to about 26 recently (actually 31 in 1949). Allowance must be made for the 62·5% overall increase in the rating of motors involved, but, in the absence of any statistics to support the opposite view, it appears that the electrician of today is less careful of his safety than was his forerunner 20 years ago.

After considering all this, however, Mr. Harvey ends his report on a confident, if warning, note: "The main trend in the application of electricity to mining is definitely in the direction of increased safety . . . all that can be done on the material part of the installation is being done, and we are left with the human element which shows little if any sign of improvement, and was responsible for 84% of all electrical accidents. If the accident rate is to be reduced, education and training in safety must be given, not only to the "new entry"—the apprentices—but to the existing electrical staffs at collieries. If an apprentice sees a senior man in the pit . . . ignoring common sense and getting away with it, his own safety training will soon be forgotten.

## Trade Groups Agree on Mutual Aid

IMPORTANT developments which should eventually aid British exporters result from the tie-up between the Federation of British Industries and the British Export Trade Research Organisation, announced in London last Thursday.

With the sanction of their respective councils, F.B.I. and B.E.T.R.O. have concluded an "Engagement to render Mutual Aid." Besides eliminating a certain degree of overlapping of effort and function, the collaboration is intended as a positive move to improve help available to British exporters.

B.E.T.R.O. will continue to be an entirely independent overseas research body and, under this new arrangement, will be financed solely by industry through its membership and turnover of work. During the interim period, while collaboration arrangements are being carried out, B.E.T.R.O. will continue to draw on the remainder of the Board of Trade grant-in-aid (about £44,000 remains).

In countries overseas where both the trade groups maintain offices, a considerable amount of regrouping will take place. Where possible the two organisations will occupy the same offices.

The Federation will promote the wider use of market survey and research work, and by being given facilities to use the services of the F.B.I. overseas representatives, B.E.T.R.O. will be able to arrange market research schemes at an economical cost. It will also cease to handle export enquiries that are outside the field of market survey and research and which are part of the normal functions of the F.B.I., Board of Trade, and other organisations.

First joint action of the two groups takes place shortly. Both Sir Norman Kipping, director-general of F.B.I., and Mr. Roger Falk, director-general of B.E.T.R.O., are this week visiting America independently to inspect and develop their respective offices. Advantage of the visits will be taken for joint talks with American market research organisations to build up a product-testing service there to aid British manufacturers. Because of the scale of the operation, it is hoped that these facilities will be available at reduced rates.

# Design for the Home

## *Council of Industrial Design opens an Exhibition of 1951 Stock List products*

DESIGN is to play a major part in the Festival of Britain and for some time British manufacturers have been submitting details of their products for inclusion in the 1951 Stock List. From the list—a photographic index compiled by the Council of Industrial Design—exhibits for the official Festival exhibitions will be shown under the title "1951 Design Review."

On Tuesday, as a guide to manufacturers who have not yet submitted details of their products, the Council opened an exhibition of domestic equipment at Murray House exhibition hall, Vandon Passage, Petty France, S.W.1. The exhibition will be open until May 24 from 10 a.m.-5 p.m. on weekdays and 10-12 a.m. on Saturdays. Admission is by trade card.

On show are the latest models of standard domestic equipment, distinguished by their design and workmanship, as well as a number of products which incorporate a new principle, meet a new demand or solve an old problem in a new way.

As one would confidently expect, electrical appliances are well represented. Of the 80 products on show, 10 are electrical, while of 170 photographs, there are more than 40 of electrical goods.

Electrical exhibits on show include: SAMPLES: "Bustler" vacuum cleaner, *Vacuums Ltd.;* Mary Ann Doubleway automatic iron, *Thorn Electrical Industries, Ltd.;* "Hotway" water heater, *Campbell Engineering Co., Ltd.;* portable electric fire, *Arora Company;* horizontal toaster *E.M.I. Sales and Service, Ltd.;* Atomix mixer, *Measuring and Scientific Equipment, Ltd;* "Cleanline" cooker, *Jackson Electric Stove Co., Ltd.;* Baby Belling cooker, *Belling and Co., Ltd.*

PHOTOGRAPHS: electrically heated wash boiler and electrically heated washing machine, *Burco Ltd.;* Versco wash boiler washing machine, *Universal Boilers and Engineering Co., Ltd;* washing machine *Hoover, Ltd.;* washing machine (Servis), *Wilkins and Mitchell, Ltd.;* airing cabinet, *Dunkleys (London) Ltd.;* iron, *Easipower Ltd.;* Clem thermostatic iron, *Clayton Lewis and Miller, Ltd.;* H.M.V. iron and travelling iron, *E.M.I. Sales and Service, Ltd.;* towel rail ("Mindus"), *Midland Industries Ltd.*

Dish washer, *Dowsing Co. (Electrical Manufacturers), Ltd.;* suction cleaner, *Electrolux, Ltd.;* "Dustette" hand suction cleaner, *Hoover, Ltd.;* floor polisher, *Vactric Ltd.;* "Electric Maid", *H. Fisher (Oldham), Ltd.;* "Double Dome" fire, *B. and T. (Essex), Ltd.;* fire, *Ferranti, Ltd;* electric fire and ozone unit, *Delaney Gallay, Ltd.;* space heating unit and towel rail, *Hurseal Ltd.;* water heater, *Tidas Electric, Ltd;* water heater, *Berry's Electric, Ltd.*

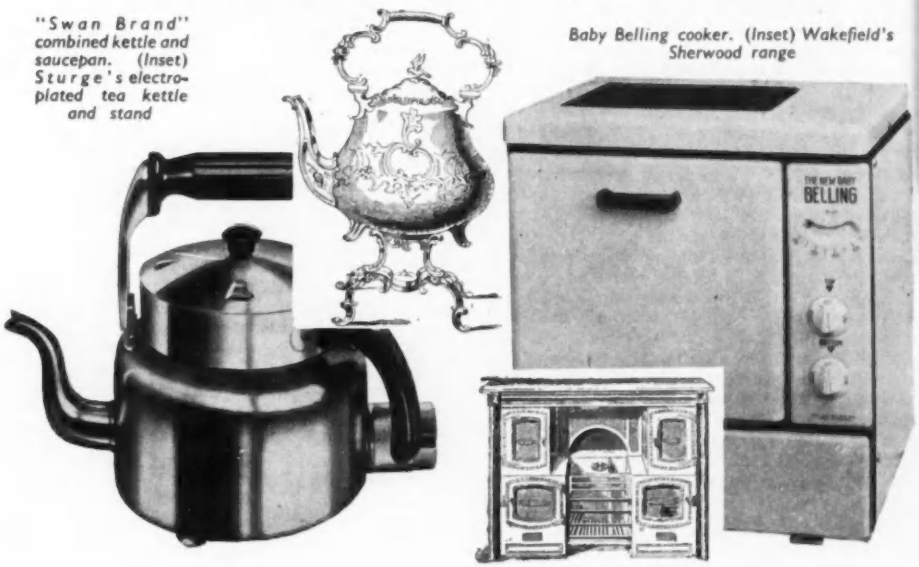
Astral refrigerator, *Astral Equipment, Ltd.;* Prestcold 311 refrigerator, *Pressed Steel Co., Ltd.;* Scophony-Baird fan, *Scophony-Baird Ltd.;* combined electric kettle and saucepan, *Bulpitt and Sons, Ltd.;* kettle, *Grafton Heater Co.;* toaster (Raylux), *Hume Atkins, Ltd.;* "Cheeto" mixer, *John Perry (Plastics),* cooker, *Belling and Co., Ltd.;* table cooker, *Elexcel, Ltd.*

Portable boiling table, *Revo Electric Co., Ltd.;* massager, *Pifco, Ltd.;* dry shaver, *Arvin Electric, Ltd.;* washing machine and electric cleaner, *British Vacuum Cleaner and Engineering Co., Ltd.;* airing appliance "Dri-Tree," *A. E. Hutchings and Co.;* rotary ironing machine ("Oprim"), *Aircraft and General Engineering Co., Ltd.;* electric radiator, *Bratt Colbran, Ltd.;* electric storage water heater, *British National Electrics, Ltd.*

*How far has design advanced in a century? 100 years ago great grandfather was making similar preparations for the 1851 exhibition. Our small inset illustrations from the official catalogue afford some comparison with two electrical appliances on the current stock list*

*"Swan Brand" combined kettle and saucepan. (Inset) Sturge's electroplated tea kettle and stand*

*Baby Belling cooker. (Inset) Wakefield's Sherwood range*



# The Faraday Shields Go North

REPRESENTATIVES of the Yorkshire and S.E. Scotland Area Boards won the finals of the E.D.A. Public Speaking competitions, held last Thursday at the Lighting Service Bureau.

Winner of the women's section was Miss Lorna Mary Kaye of No 1 district Sheffield Sub-area of the Yorkshire Area Board (see page 695). The men's section was won by Mr. David Cameron, of Berwick (Southern Sub-area South East Scotland Area Board).

*Winners and Judges in the E.D.A. Public Speaking Competition*
*L. to R. Mr. J. W. Thomas, Mr. V. W. Dale, Mr. D. Cameron, Mr. R. A. S. Thwaites, Miss Vera Norvick, Mr. J. A. Stedman, Miss L. M. Kaye, Mr. Frank Phillips.*

Second in the women's section was Mrs. Margaret Alcorn of the N. Western Board (Manchester) who took second place in last year's finals, while Mrs. Margaret Leighton Smith of S.W. Scotland (Glasgow) took third place. All three took as their theme "Electricity in Schools." Runners up in the finals were Miss Mavis Elliott (Prescot, Merseyside and N. Wales); Miss Mary Theodora Cooke (Reading, Southern); Miss Margaret Holmes (Alnwick, North Eastern) and Miss Maisie Gwenda Leeming (Edgware, Eastern).

Second and third in the men's section were Mr. Ernest Hodgson (Scarborough, N. Eastern) and Mr. Derek Basil Garwood (Cardiff, South Wales).

Adjudicating the competition, were Miss Vera Norvick (E.A.W.), Mr. J. W. Thomas (Director of Training, B.E.A.) and Mr. Frank Phillips (B.B.C.).

The "Faraday" shields, an innovation since last year's competitions, were first presented to last year's winners, the women's going to Miss D. E. Wagstaff of Barnet. The men's shield was formally received by Mr. W. A. Crocker (manager, York Sub-area) on behalf of last year's winner, Mr. J. Spencer (Scarborough).

# Past Presidents Get Together

## *Reunion at A.S.E.E. Dinner*

WITH the exception of Sir Frank Gill, unavoidably prevented by illness, every past president was amongst the guests at the annual dinner of the Association of Supervising Electrical Engineers, which was held last Friday and attended by over 500.

Proposing the toast of "The Electrical Industry," Mr. J. R. Beard (past president) recalled the founding of the Association in 1914, referred to the phenomenal growth of the electrical industry, of which the manufacturing side was now the third largest industry in the country, next to agriculture and mining. Defining the objects and scope of the A.S.E.E. for the benefit of visitors, he pointed out that the remuneration and status of the supervising engineer was only one consideration; the other side of the picture might be defined as helping and training, and some of the methods were outlined.

Col. B. H. Leeson (director, B.E.A.M.A.), said that replying on behalf of the electrical industry was rather like speaking for infinity. Electricity not only provided the ordinary amenities of life, but the production facilities for all industry. Where, he asked, should we be without proper supervision? We had a vast industry, vast because the parts are all efficient and the Association was an efficient part, and he paid tribute to their efforts on behalf of the industry.

Mr. A. G. Ramsey, the president, proposing "Our Guests," said that it was an honour to preside for the second year in succession over an association with so many distinguished past presidents. Referring to the wide range of the Association's interests, he pointed out that they produced 250-300 lectures and papers a year on subjects ranging from thermal power to electricity in medicine. The war and its after-effects had laid an additional obligation upon them. Many young men whose training had been interrupted had only succeeded in obtaining either practical experience or theoretical knowledge. He appealed to members to bear in mind this problem and to help them in every possible way.

Sir Henry Self, replying, made reference to the deep interest which the B.E.A. and Area Boards had in the work of the Association.

# Hydro Power for Wales?

## *YES!*

### says the Merseyside and N. Wales Division

A STATEMENT recently issued by the Merseyside and N. Wales Division summarises the case for the Authority's scheme for hydro-electric development in N. Wales. This comprises extensions to the existing Dolgarrog and Maentwrog schemes, and new projects at Upper Conway, Mawddach, Rheidol, Snowdon, Ffestiniog, and Nant Ffrancon. The total cost would be about £20 m. for a total capacity of approximately 350 MW, with an average annual output of 520 million units.

#### *Amenities*

On the amenities question, it is stated that the total amount of land which would be flooded is a little over four square miles, most of which is either boggy or suitable only for rough grazing. No existing rivers will be dried up or completely diverted, and fishing interests will be safeguarded by arrangements between the Authority and the appropriate River and Fishery Boards. Where the schemes affect natural water flows and interfere with the supplies of water normally available for cattle or domestic purposes, piped supplies will be arranged.

Where leats are found necessary, bridges will be provided at suitable points to facilitate the movement of sheep. It is pointed out that opposition on the grounds of spoliation has been raised in the past against Lake Thirlmere (supplying water to Manchester), against the Galloway scheme and even against the North of Scotland scheme and in all cases, it is stated, the schemes have actually improved the amenities.

#### *Advantages Claimed*

Advantages claimed for the scheme, in addition to the obvious one of adding to Britain's generating capacity, are that it will speed up rural electrification by providing new points of supply at comparatively low voltage; that collaboration with water supply authorities will ensure the best use of dams and water collection facilities in the interests of both parties; and that the schemes will provide employment for Welsh labour, both skilled and unskilled.

It is pointed out that even when all the hydro stations are commissioned, North Wales will still be, on balance, importing energy from England although there will be transfers of power in both directions.

## *NO!*

### says the North Wales (Hydro-Electricity) Protection Committee

PRINCIPAL objections set out in a brochure recently issued by the Committee (constituted from the Councils for the Preservation of Rural England and Wales; the British Mountaineering Council; the Merseyside Advisory Committee of Open Air Organisations; and the Birmingham Open Air Society) are, of course, based on the despoiling of the countryside. North Wales and the Lake District are the only two areas of real mountain grandeur south of the Border—being small, they are proportionately precious. Comparisons with hydro developments in other countries are completely fallacious, since in a vast area it is possible to find room for what would, in a small scale landscape, be a fatal injury.

#### *What of the Farmer?*

In addition to the purely aesthetic, there is the utilitarian aspect to be considered. Diversion of water from one watershed to another will seriously injure the hill farmer, as will the "leats" (open water courses) which will completely interrupt the natural seepage of the under-surface water, in addition to the physical obstruction which they present, adding considerably to the difficulties and dangers of sheep-farming, even though fenced and bridged.

This blow in the face for the hill farmer, carries little or no compensating advantage. There is no guarantee that the man whose land is despoiled will get a supply of electricity—in fact, the isolated farmstead, which is the pattern of Welsh rural life, is likely to be the last served, since distribution, not generation, is the real difficulty. The B.E.A.'s argument, that the schemes will supply "local" needs, is mere sophistry, and the real object of this wholesale despoliation of local amenities—bringing ridicule on the National Parks Act—is to provide peak power for the Merseyside and N. Wales Board's industrial area, which can be done just as well with gas turbine sets at a fraction of the cost.

The saving in coal, to be expected from the elaborate hydro schemes, would be about 375,000 tons/year or less than 1/500th of the national production of deep mined coal. Responsible opinion states that in 3-4 years time the problem will be to sell the coal produced and since power stations are the only market for the low grade fuel which is being produced in increasing quantities, the inauguration of a scheme which will cost £20 m. and take 15 years or more to complete, has little or nothing to recommend it.

# OPEN AIR BOILERS AT MANCHESTER

## *Heat-Electric Generation at a Chemicals Plant*

COMBINED heat-electric generation has been much in the news recently, and this fact gave a topical interest to the paper by E. BONWITT and H. E. CHARLTON, A.M.I.CHEM.E., M.INST.F., at the Institute of Fuel on Wednesday, under the title "The Fuel, Heat and Power Aspects of the Petroleum Chemicals Plant for Petrochemicals, Ltd., Partington." The plant concerned is situated between the Manchester Ship Canal and the River Mersey, near the site of the B.E.A. Carrington Power Station and also, of necessity, near a large gasworks. At present the design is such that some 100,000 tons/annum of petroleum naphtha can be treated by distillation processes to yield a wide range of organic chemicals.

In the operation of the plant, steam is required at various pressures for distillation purposes, and also for the cracking of naphtha (at about 703° C), the concentration of sulphuric acid, the heating of pipelines carrying viscous products and the space heating of buildings. Power, as distinct from heat, is needed for the pumping, compressing and mixing of products, as well as for lighting and for driving ancillary machines.

### *Generating Plant*

The simplest solution would have been to buy both steam and electricity from the Carrington power station, which was originally expected to be ready at about the same time as the Petrochemicals' plant. However, in the opinion of the C.E.B., when the matter was considered it was not worth while to change existing plans to give the required 112 k lb/hr of process steam and 2 MW of electrical load required.

Other solutions considered included the provision of a relatively cheap boiler plant operating at 300 lb/sq in. and 100 lb/sq in., which would allow 2,000 h.p. to be generated in back-pressure steam engines and about 800 kW in a turbo alternator. 1,200 kW could be taken from the public supply. A third possibility was to generate steam at 600 lb/sq in. and expand to 150 lb/sq in. and 20 lb/sq in. in pass-out turbines. The electrical energy which could be generated would be about 3,600 kW.

Finally, a more flexible scheme was adopted. There are three gas and oil fired 56 k lb/hr marine type water-tube boilers used, built in the open and supplying steam at 625 lb/sq in., 415° C at the stop-valve. Only the boiler fronts and instrument boards are under cover, the combustion chamber being surrounded on three sides and on the roof by steam raising tubes. A sheet-steel overall casing is provided.

Although coal was the obvious first choice for fuel, it could only have been used for the steam boilers, and it had the additional disadvantage of requiring a large area of ground for sidings and bunkers and this, in turn, would have had to be separated from the petroleum plant for safety reasons. Oil has the advantage that it can be fired in any proportion with the gas that is a by-product of the processes carried on in the plant.

The top half of the boiler plant is taken up by steam mains, all of which are duplicated or form part of a ring. Steam for process work, space heating, etc., is used at 600 lb/sq in., 150 lb/sq in. and 20 lb/sq in. Two 2 MW back-pressure turbines run at 6,000 r.p.m. and drive 3·3 kV 4-pole alternators through a single reduction gear. A main switchboard is provided, with o.c.b.s rated at 100 MVA breaking capacity. As supply continuity to some items of plant is of prime importance, a stand-by supply of 500 kVA is taken from the Electricity Board, and a stand-by diesel alternator set rated at 330 kVA is installed.

### *Distribution*

Supplies at 3·3 kV are taken to a number of substations outside flameproof areas, each of which has a 3,300/420 V transformer and the necessary 420 V and 240 V distributing and control gear. As an alternative to laying an expensive h.v. ring main to give stand-by supplies, certain substations have been interconnected by 420 V cables, with no-load change-over switches.

An interesting feature of the plant is the installation of some 700 flameproof motors. Most of these are remote-controlled by contactor starters of standard non-flameproof design, which are installed in substations and operated by flameproof push-buttons at the motors. The drawback to this system is the large amount of small cabling required; m.i.c.c. cable is used on all control circuits and for motor connections up to 5 h.p.

# HOTEL PASSENGER LIFTS

## *New Waygood-Otis Installation at Grosvenor House, London*

THE design of passenger lifts for luxury hotel service involves consideration of both physiological and psychological effects as well as the purely functional operation of passenger carrying. Allied to the necessity for carrying the maximum number of passengers in the minimum time—and passenger loading has its "peak" problems—is the need for smooth acceleration and deceleration to ensure passenger comfort, the presence of a uniformed attendant to provide service and inspire confidence, and the vitally important essential of absolute reliability.

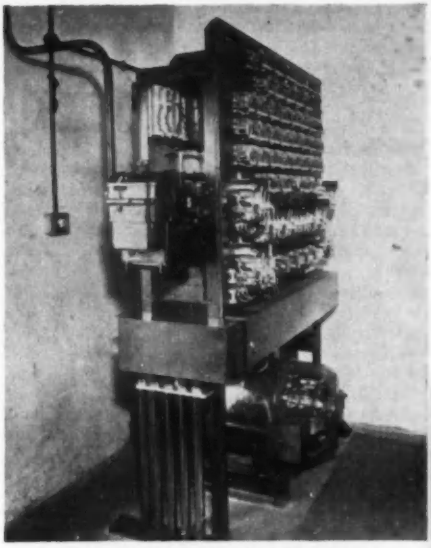
We were, therefore, considerably interested to examine the new lifts installed by Waygood-Otis in Grosvenor House, of which the first two were formally inaugurated last week.

### *Operation*

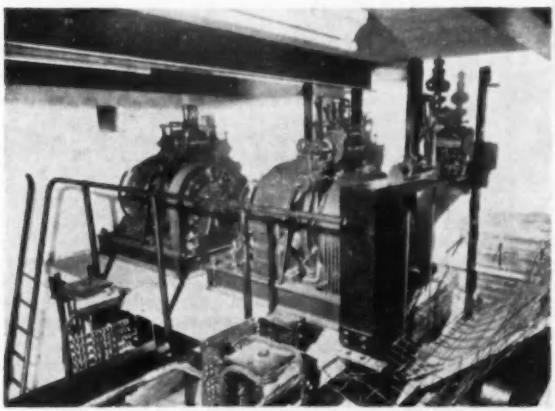
Ultimately four lifts, running in adjacent shafts will be installed, and will work as a group. By pressing the "up" or "down" button located on the landing, an intending passenger automatically calls the nearest lift moving in the right direction. In the event of this lift being full, the attendant merely pushes an internal switch which transfers the call, again automatically, to the second most convenient lift. By this means it is anticipated that a maximum waiting time of only 28 seconds can be achieved. (The maximum average "patience" time is about 45 seconds.) As each lift holds fourteen passengers the combined carrying capacity with a maximum speed of 400 ft/min is just over 1,300 passengers per hour.

### *Technical Points*

The lift motor and auxiliary plant are installed in a rebuilt lift house on the roof. This rebuilding was necessitated by the introduction of gearless motors which, with a maximum speed of 102 r.p.m. are somewhat larger than the original lift motors. Control of the d.c. winding motors is exercised by a high-speed specially designed motor-generator converting set. The generator of this unit is unconventional in that in addition to the normal series and shunt field windings it also carries an exciting field winding and a de-magnetising field winding. The exciting winding is fed from a metal rectifier bank and is used to determine the polarity of build-up of the output voltage—which in turn determines the direction of rotation of the winding motor—and the de-magnetising winding comes into operation for decelerating and levelling the lifts.



*The control panel and generator set*



*The two d.c. slow-speed, gearless winding motors*

# overseas news

### Cyprus Scheme

Further contracts have now been placed for the remainder of the work involved in the scheme for an electricity supply system to serve all parts of Cyprus (we noted in our September 8, 1949 issue that contracts had been placed for three John Thompson 90,000 lb/hr boilers, three Met-Vick turbo alternators, two 7,000 kW and one 14,000 kW, together with a Harland and Wolff 750 kW house service diesel alternator set). Contracts have now been placed with Metropolitan-Vickers for the 66 kV and 11 kV switchgear and 66 kV transformers, with Lindley Thompson Transformer and Service Co. for 11 kV transformers, and with British Insulated Callender's Cables, Ltd., for the 66 kV and 11 kV transmission lines. The civil engineering work is to be carried out by Sir Lindsay Parkinson and Co., in association with the Titan Construction and Engineering Co. John Thompson are to supply the pipework and Sir William Arrol and Co. the cranes.

The scheme provides for the erection of a 70,000 kW generating station at Dekhelia, near Larnaca, with an island-wide network.

The work is to be carried out in stages. The first, which is now in hand, provides for the installation of 28,000 kW of power plant, and the erection of 163 miles of 66 kV and 63 miles of 11 kV single circuit transmission lines. The station will be of the semi-outdoor type, with oil-fired boiler plant, the turbo-alternators being covered only by a light removable aluminium roof. Sea water is to be used for cooling purposes. The main transmission system will link up Dekhelia, Larnaca, Limassol, Lefka and Nicosia, with a spear to Famagusta. The secondary 11 kV network will give bulk supplies and feed l.v. distribution mains. It is hoped that in 1951 the new system will be available to relieve the island's existing stations, which are heavily overloaded.

### Plan for Queensland

Authority has been given to the State Electricity Commission of Queensland to prepare schemes to provide an electricity supply to many of the more remote towns in the State. The Minister for Mines has said that for some time the Government had been considering the need to provide electricity for these townships, whose small relatively stationary population, sparse settlement and high operating costs had constituted a problem not apparent to the same extent in the more closely-settled parts of the State. The problem had been solved by special measures, which included a Government subsidy of not less than 50% of the capital cost of the schemes, and an arrangement between the State Electricity Commission and the industrial unions concerned for the installing of a type of plant that would reduce operating costs to a minimum. It was intended that the plants installed would be sufficient to cater for icemaking works and cold storage in addition to lighting and power. The Commission has since announced that 17 small Western Queensland towns will each have its own diesel generating station.

### Perth's Frequency Changer

Work is proceeding at the East Perth power station, Western Australia, on the erection of a frequency changer plant, estimated to cost £350,000, which will handle supplies from the South Fremantle station when the latter starts up, probably late this year. This station will generate at 50 cycles, while the Perth Metropolitan system is 40 cycles and is not likely to be changed over for some years yet. The frequency-changer, which will be semi-automatic in operation, is being housed in a new annexe to the main turbine room at the north end of the East Perth power station. It will be fed from South Fremantle by a 66 kV o.h. double circuit line.

### Tree-Lopping in Victoria

Tree-lovers, by protesting against the lopping of trees, are delaying the extension of electrical power and light services to residents of Clematis, Avonsleigh, Cockatoo and Gembrook, in the Dandenong Ranges, Victoria, Australia. For several months the State Electricity Commission has been extending its power lines through the districts on the southern side of the Dandenongs, but the project will probably stop at Menzies Creek, because the Country Roads Board has decided that the practice of tree-lopping shall cease. Many residents who have already wired their homes and installed electrical appliances in the expectation of an early service consider that sentiment is being carried too far. It is maintained that the trees are not destroyed, but are only lopped 8 ft. from the ground, and will grow again.

### N. S. W. Commission Bill

The New South Wales Government's Electricity Commission Bill had its second reading in the Legislative Assembly earlier this month. Members of the Opposition made protests and urged the Government to withdraw the Bill or postpone its operation until September next. The Bill provides for the setting up of a Commission of five members to co-ordinate and control electricity supplies in N.S.W., and gives the Commission power to assume immediate direction of power stations controlled by the Sydney County Council, the Railways Department, and the southern electricity supply.

It also provides for the Commission to negotiate for the purchase of the Electric Light and Power Supply Corporation, of Balmain, and the Parramatta and Granville Electric Supply Co.

**Traction Motors for Toronto**

An important order has been obtained by Crompton Parkinson Ltd. for the supply of a quantity of traction motors to the Toronto Transport Commission. These motors will be mechanically and electrically interchangeable with the latest type of American motor fitted to the Commission's P.C.C. tramcars. All external fittings and significant dimensions will be the same as those of the American motors and certain renewable parts, such as brushes, will be identical to maintain continuity in the established system of standardised replacement and maintenance. The method of construction of the C.P. motor allows an armature of a large diameter to be fitted into a frame of the same diameter as the American machine. Also, the C.P. motor will give a performance superior to the U.S. motors now being used, in respect of stability during rheostatic braking at high speeds, it is claimed. This characteristic has been proved on tramcars operating in Blackpool and Glasgow equipped with Vambac cardan shaft equipments developed by the firm. Excluding shaft brake, the motors, which are force ventilated, each weigh 700 lb., and have a one hour rating of 55 h.p. 156 A at 300 V, and a continuous rating of 41 h.p. 127 A at 300 V. By this development Crompton's have opened up the possibility of their substitution in the hundreds of standard tramcars with Clark truck and P.C.C. equipments operated overseas.

**Canadian T V**

The Canadian Broadcasting Corporation has placed an order valued at more than $300,000 with Marconi's Wireless Telegraph Co., Ltd., for television studio equipment for C.B.C. production centres at Montreal and Toronto. Earlier it had been stated that four Canadian and two British firms had submitted tenders.

**New Kootenay Unit**

The Consolidated Mining and Smelting Co. has this month put into operation a further 27,000 kW unit at its Brilliant power plant on the Kootenay River, at an estimated cost of $1,250,000. This, with the two existing units, brings the total capacity of the station to 81,600 kW, and the total rated capacity of the company's four plants on the Kootenay River to 224,050 kW. The new unit comprises a generator made by Canadian Westinghouse Co., and a turbine by the Dominion Engineering Co., Ltd.

**Niagara Treaty**

In Toronto a few days ago, Prime Minister St. Laurent and Ontario's Premier, Mr. L. Frost, brought the Ontario-New York hydro-electric expansion a further step nearer realisation, when they signed an agreement transferring to the province Canada's part of Niagara water rights. Under this, Ontario will (a) pay for "remedial" works to be carried out above the falls under the direction of the International Joint Commission; and (b) build a tunnel and canal 6½ miles to Queenston, more than doubling generating capacity there. Engineers are now busy preparing preliminary plans and estimates. The U.S.-Canada Niagara Water treaty was initialed in Washington some weeks ago. It still awaits ratification by the U.S. Congress and the Canadian Parliament.

**New Westinghouse Plant**

A new $400,000 building is being erected at Three Rivers, Quebec, at a branch plant of the Canadian Westinghouse Co. Initially some 300 workers will be employed, but it is anticipated that this figure will rise to 1,200. The plant will be devoted to the manufacture of all types of electric lamps, including fluorescent tubes. Other products will be made later as extensions are added.

**Roxburgh Project**

Hopes that the target date for the completion of the Roxburgh Gorge hydro-electric scheme, New Zealand, would be improved, were expressed recently by Mr. C. W. O. Turner, assistant engineer in chief of hydro-electric construction to the Ministry of Works. The announced target date was 1956, but whether that could be improved depended on the physical resources available. Ultimate capacity of the scheme is 320 MW made up by eight 40 MW generating sets, the first stage comprising four units. All major items for the construction work were on order, and tenders for the generating plant were being called, he said.

**Supply Problem**

With demand outstripping the capacity of the local generating plant, the Kroonstad Town Council, Orange Free State, is faced with the necessity to augment its supply. The Town Council claims that the inability of the Electricity Supply Commission of South Africa to obtain heavy generating machinery from overseas according to schedule is costing the town a great deal of money. When, six years ago, the town was urged by its consulting engineer to increase its local power supply, the Council applied for authority to install the necessary plant at a cost of £60,000. Instead, the Council was asked to consider scrapping its power station and taking a bulk supply from the Victoria Falls and Transvaal Power Co. This proposal was rejected, but later the Council entered into a contract to take a partial bulk supply. This link up will soon take place, but the power obtainable will not meet the town's needs. Consequently the Council has decided to renew its application for permission to enlarge its own station, at a cost of £97,000. The Commission claims that, with full co-operation from Kroonstad through the difficult period, the taking of a partial power supply over the next 12 or 18 months could solve the town's problem and save at least £60,000.

# *PERSONALITIES*

## IN THE INDUSTRY

Previously metering engineer to the London Generating Division, **Mr. F. Byrne,** A.M.C.T., A.M.I.E.E., has been appointed plant specialist (meters) at B.E.A. headquarters. He received technical education at the Manchester College of Technology, and training with Ferranti Ltd., afterwards serving with Mather and Platt Ltd. and the Bury and Salford electricity undertakings. He then became metering engineer in the South East and East England districts of the C.E.B. from its inception. Mr. Byrne was author of a recent I.E.E. paper on metering practice on the British grid system, it will be recalled.

*Mr. F. Byrne*

Colleagues of **Mr. W. H. Steele,** A.M.I.E.E., control superintendent at St. Paul's Grid Control Area, who has been suffering from failing eyesight, will be glad to learn that following on two major operations, he has now completely recovered.

At the annual meeting of the Derby Electrical Society, **Mr. H. L. Jones,** M.I.E.E., was elected president, with **Mr. D. R. F. Milner,** M.I.E.E., and **Mr. S. J. R. Allwood,** A.M.I.E.E., vice-presidents, **Mr. W. H Buxton,** A.M.I.E.E., chairman, and **Mr. W. H. Taylor** as vice-chairman and honorary treasurer.

After many years with Joseph Sankey Bros. Ltd., Bilston, as chief electrical engineer, at their Manor and Bankfield works **Mr. A. Smith** retired recently. He is a past chairman of the Wolverhampton branch of the A.S.E.E.

At the annual general meeting of the Council of the Electrical Development Association held last Friday, it was announced that the **Rt. Hon. Lord Citrine,** P.C., K.B.E., comp.I.E.E., chairman of the B.E.A., has accepted office as president of the association for a third year. At the subsequent meeting, **Mr. E. R. Wilkinson,** M.I.E.E., M.I.Mech.E., commercial manager of the B.E.A. was appointed chairman of the Council for the ensuring year, with **Mr. C. T. Melling,** M.Sc., M.I.E.E., M.I.Mech.E., chairman of the Eastern Electricity Board, as vice-chairman. The new chairman, Mr. Wilkinson, has had considerable experience in the manufacturing, consulting and supply sides of the industry, first with English Electric Co., then Merz and McLellan, joining the C.E.B. in 1928 as deputy to the commercial manager, becoming commercial manager in 1937.

*Lord Citrine*

*Mr. E. R. Wilkinson*

*Mr. C. T. Melling*

For the vacancies which will occur at the end of September next, **Sir Archibald J. Gill,** B.Sc. (Eng.), M.I.E.E., assistant director general (engineering) and engineer-in-chief of the G.P.O. has been nominated for the office of President of the Institution of Electrical Engineers. For the two vacancies as vice-presidents, **Mr. H. Bishop,** C.B.E., B.Sc. (Eng.), M.I.E.E., chief engineer of the B.B.C., and **Sir George H. Nelson,** M.I.E.E., chairman of Marconi's Wireless Telegraph Co. Ltd., and chairman and managing director of the English Electric Co. Ltd., have been nominated. **Mr. H. Nimmo,** M.I.E.E., M.Inst.C.E., M.I.Mech.E., chairman of the Southern Electricity Board, is nominated for the office of honorary treasurer.

Ekco-Ensign Electric Ltd. have appointed two new representatives covering the Lancashire and Yorkshire Areas. **Mr. R. Seagrave** will operate from Leeds and undertake specific duties in Yorkshire, while Lancashire will be handled by **Mr. W. E. Garratt,** operating from Manchester, in a similar capacity. Both will be based on the company's Preston office.

To succeed Mr. C. J. Chisholm who was recently appointed public lighting engineer to the City of Sheffield, **Mr. R. Kerr,** assistant lighting superintendent with Dumbarton Town Council, has now been selected as public lighting engineer at Greenock. He takes up duties on May 1.

Now advertising and publicity manager to High Duty Alloys, Ltd., **Mr. D. C. Embley** is shortly to take up a similar position with H. W. Carter and Co. Ltd.

Just back from a six-month business tour, embracing eleven countries, is **Mr. A. H. Bull,** export manager of Oldham and Son Ltd.

Earlier this month, **Mr. J. Maloney,** A.M.I.E.E., H.M. Government electrical inspector at Port of Spain, Trinidad, reached this country on six months' pre-retirement leave. During his absence **Mr. G. T. Clarke,** who has been acting as mechanical engineer to the Trinidad Government Railway, will act as chief electrical inspector. Mr. Maloney, who took up the post in Trinidad in June, 1947, was previously engineer-in-charge of the Electricity and Telephone Department, Grenada, for seven years.

**Prof. Sir Ian Heibron,** D.S.O., F.R.S., has been appointed chairman of the Advisory Council for Scientific and Industrial Research, in place of **Sir Geoffrey Heyworth** who resigned owing to pressure of other public duties.

Newly appointed generation engineer, operation, to the Midlands Division, B.E.A., as we briefly noted last week, **Mr. L. A. E. Fosbrooke,** B.SC., A.M.I.E.E., has been station superintendent at Brighton "A" power station for four years. Previously he had filled a similar post at the Blackburn Meadows station. He gained his technical education at University College, London, and training at the Deptford power stations of the London Power Co. Subsequently he successively held the post of charge engineer at Brighton "A," Fulham, Littlebrook and Battersea (L.P.Co.) power stations, before going to Deptford East as boiler house superintendent.

*Mr. L. A. E. Fosbrooke*

C. A. Parsons and Co., Ltd., announce that **Mr. A. McLean,** until recently a local director of Barclays Banks Ltd., Newcastle-upon-Tyne, has been appointed to their Board of Directors.

Bylock Electric Ltd., announce that **Mr. W. J. Cakebread,** A.M.I.P.E., A.M.I.I.A., has joined their staff to implement the Motor Design Section. He has previously served as production manager of the Croydon Engineering Co. and production engineer of the F.H.P. Motor Department of the Plessey Co.

Winners of their respective sections of this year's E.D.A. Public Speaking Competition, details of which are given on page 688, were **Miss Lorna M. Kaye,** and **Mr. D. Cameron.** This was Miss Kaye's first attempt at public speaking, other than at demonstrations. She has been with No. 1, Sheffield district of No. 3 sub area of the Yorkshire Electricity Board for the past year, after earlier experience with a local firm as a demonstrator of domestic washing machines, and with a firm of food manufacturers as travelling demonstrator. Mr. Cameron serves as Berwick service centre district representative of the Southern sub area of the South East Scotland Electricity Board. He was trained in the consumers' engineers department of the Scottish Southern Electric Supply Co., Ltd., at Galashiels.

*Miss Lorna M. Kaye*

*Mr. D. Cameron*

The Council of the Electrical Research Association has appointed **Dr. W. B. Whitney,** M.INST.C.E., M.I.E.E., to be assistant director of research, under Dr. S. Whitehead. Dr. Whitney joined the E.R.A. at its inception, and has been in charge of the researches on switch and control gear, which position he is retaining. He was chiefly responsible for invention and development of the gas blast circuit breaker and the side blast baffle.

Chief engineer of the English Electric Co. of Canada, Ltd., **Mr. M. B. Mallett** has been elected a member, representing Canada, on the International Transformer Committee of the International Conference on Large Electric Systems (C.I.G.R.E.)

**Mr. J. E. Chamberlain,** managing director of Switchgear and Cowans, Ltd., is to succeed **Mr. H. Burroughes** as chairman at the annual meeting on April 18.

## OBITUARY

We note the death, on April 21, of **Mr. J. W. F. Warren,** M.I.E.E., aged 78, who was associated with the earlier introduction of electricity to shipyards, and collieries around the North East coast.

The death has occurred of **Major Sir Hubert Young,** K.C.M.G., D.S.O., aged 64, chairman of the Southern Area Electricity Consultative Council.

We learn of the recent death of **Mr. C. M. Read,** aged 74, who was for many years district engineer of Pirelli-General Cable Works, Ltd., in South East England and East Anglia.

The death occurred recently of **Mr. A. L. Vanneck,** A.M.I.E.E., aged 49, for many years on the engineering staff of the General Electrc Co., Ltd.

**WILL—Col. Sir Thomas Purves,** O.B.E., M.I.E.E., former director of the C.M.A., left £10,482 (£10,357 net value).

# Lord Citrine Demands More Plant

## *Danger of planning the Industry out of Existence*

ONE of the outstanding dates in the electrical calender has always been the annual luncheon of the Electrical Development Association. Under the present conditions we are pleased to see that there is no diminution of its former brilliance, and this year's luncheon at the Connaught Rooms last week had all of the trappings of a grand occasion.

The principal toast was not to the Association, but to Electrical Development. It was proposed by the Rt. Hon. NOEL BAKER, Minister of Fuel and Power. He said that the gravest of his problems was that of dirty coal. It was, therefore, with gratitude that he pointed out that 65% of power stations use some sixty million tons of low grade fuel which is not wanted elsewhere. Speaking of load shedding, he suggested that everyone is peak conscious, thanks to the work of E.D.A. It was equally important that the off peak load should be built up. New inventions and services were required to this end, and he particularly referred to electric vehicles which saved £2½ million worth of imported fuel a year.

In reply to the toast the President, the Rt. Hon. LORD CITRINE, made an earnest plea for the greatest consideration to be given to the electrical industry in economic planning. There is no sign whatever of saturation and consumption is proceeding with an accumulative expansion of 6% per annum. Under present conditions there has been a loss of consumer goodwill due to load shedding and growing restiveness is obvious among industrialists due to load spreading. How long can this go on? The B.E.A. is limited by manufacturing capacity and has reluctantly been compelled to go outside this country to meet some of its requirements. The limit of 1,500 MW a year on development in this country indicates that it will be many years before we can make up shortages. And there are rumours of cuts even in this programme. If these take place it will be a disaster for British industry as a whole. He had always understood the need for planned economy. But he hoped that this did not mean the virile electrical industry, which lies at the heart of the country's prosperity, was going to be planned out of existence.

The chairman of the E.D.A. Council, Mr. R. A. S. THWAITES, proposed the toast of the "Guests". He protested against the capital cuts on distribution in the 1950 White Paper. The supply of electricity to new houses alone accounts for one-third of this allowance. Previous speakers had spoken of the expansion of the industry, but this has not been equalled by an increase in distribution facilities; transformers are being run at excessive temperatures and some h.v. switchgear is in danger of being blown sky high unless replaced shortly.

Responding, Sir VINCENT DE FERRANTI said he hoped that the time would come when the consumption per head in the home amounted to 6,000 units per annum. He asked also whether it would not be better to electrify the railways to make them solvent, rather than put 9d. per gallon on petrol. Finally, he pointed out that manufacturers had responded to the appeal for generating plant and over 400,000 kW was now in stock waiting to be put into power stations.

### *Comment*

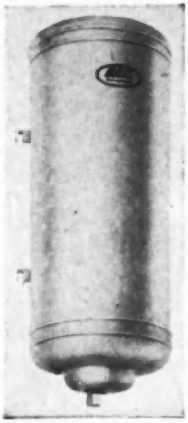
Lord Citrine's warning of the danger of continued restriction on plant development and the possibility of economic planning killing the electrical industry is the most forthright pronouncement that has yet been made on this subject. It coincides with the issue last week of the B.E.A.M.A. annual report, which drew attention to the dire and urgent need for the Government not only to restore capital cuts, but to authorise an increased programme of power station construction. This theme is no new one to our readers, but as the years pass the implications of neglect become more obvious and the need for action more urgent.

(Left) *A surprise guest at E.D.A. lunch, Mr. Harold Hobson with Mr. V. Dale.* (Centre) *The Rt. Hon. P. Noel Baker, Minister of Fuel and Power, proposes "Electrical Development".* (Right) *The chairman, Mr. R. A. S. Thwaites, chats with Lady Citrine*

# *The* BUYER'S *Column*

## Hot Water in the Air

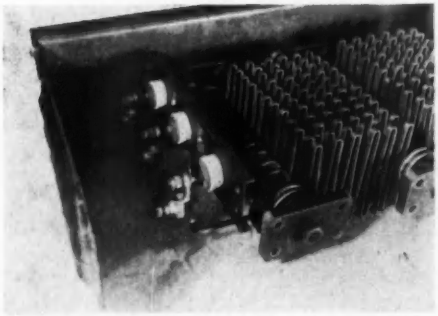
IN order to meet the increasing demand for hot water in the large aircraft now coming into service, the GENERAL ELECTRIC CO., LTD., of Magnet House, Kingsway, London W.C.2, have introduced a lightweight, all aluminium water heater of 3 gallons capacity. It operates on a 120 V supply so that it is suitable for the majority of electrical systems in these larger long-distance aircraft. The two 750 W cartridge type immersion heaters are thermostatically controlled and will maintain the temperature of the water at 170° F during withdrawals of up to 2¼ gallons. Water is supplied to the taps in the galleys and toilets on the displacement system, being under pressure from the incoming feed to the heater from the main storage tank of the aircraft.



*The G.E.C. 3 gallon aircraft water heater*

## Heavy Duty Resistances

SPECIALLY designed for use in steelworks or situations where heavy vibration is liable to be encountered, is a new range of resistances produced by the E.M.B. Co., of Moor Street, West Bromwich, Staffs. Known as the "Steelworks Resistance" this range uses steel alloy grids, heavily sheradised to prevent corrosion, although copper-nickel grids can be supplied if required.



*The steelworks resistance with side removed to show detail*

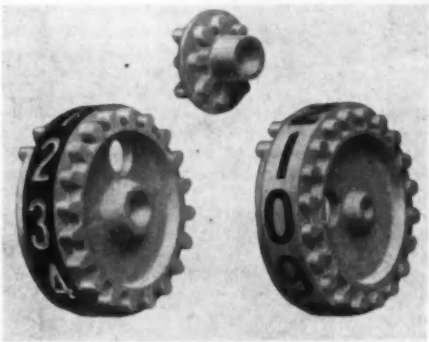
The grids themselves are mounted on micanite tubes which together with mica end washers provide primary insulation. Resistance ratings naturally vary with customer's requirements, but the design is such that the grids are calculated for a temperature rise of under 300° C as laid down in B.S. 587/1940. Thermal capacity is such that heavy intermittent overloads may be catered for.

Should grid replacement prove necessary, the section affected can be removed without dismantling the whole resistance assembly.

## Acrylic Plastic Number Wheels for Meters

RECENT developments in plastics have led to their introduction as number wheels and pinions in house service meters.

Considerable thought has been given to the use of acrylic plastics and polystyrene as alternatives to tin alloy. Whilst polystyrene possessed many suitable qualities—it has a lower specific gravity than tin alloy plus a low coefficient of friction, good resistance to moisture and availability in a wide range of colours—it does not stand up to temperatures in excess of 150° F and is subject to solvent attack by petrol. Many undertakings use petrol as a cleaning medium for meters and the use of polystyrene is again rendered undesirable.



*Examples of the Thormann range of plastic gear wheels*

The H. J. THORMANN ENGINEERING CO., LTD., of Elstree Way, Boreham Wood, Hertfordshire, well-known manufacturers of number wheels and pinions for the meter trade, carried out research into the use of these materials. In collaboration with I.C.I. Plastics Division, the company has recently developed a range of meter wheels and pinions moulded from acrylic resin, a material which to a certain extent combines the advantages of tin and polystyrene whilst avoiding the disadvantages of both.

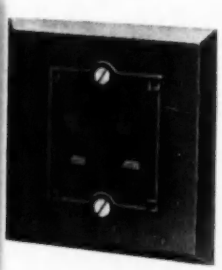
As a result of this work the company is now

able to produce meter wheels and pinions to comply with the exacting requirements of meter manufacturers. The shrinkage variation of acrylic resins used for this purpose are subject to shrinkage variations only one-third that of polystyrene, so far greater control is now possible over the dimensions of the finished products.

Their quality is of the same high degree that is associated with the other products of the company.

## D.S. Plugs Introduce 15A "Cumbrian" Switches

AN event which will be welcomed in the industry is the arrival of the new range of 15-amp "Cumbrian" tumbler switches introduced by D.S. PLUGS, LTD., Ordsal Electrical Works, Manchester 5.



These first quality switches which have been tested and approved by the National Physical Laboratory, because there is no relevant B.S.S., are designed for B.S. 1299 boxes. A special feature in addition to the rigid testing of these models is the facility of one or two-way switches accommodated either in pairs or singly in one box.

Of non-track plastic, the switches are of the snap action pattern with pillar type terminals and silver pressure contacts. The switches are provided in either brown or white plastic with a front plate of modern design moulded to give maximum strength.

Prices range from 28s. per dozen for the single-way brown plastic switches, Catalogue No. CE/2, to 73s. for the two-way double-switch models, Catalogue No. CE/11.

## Saving Sight

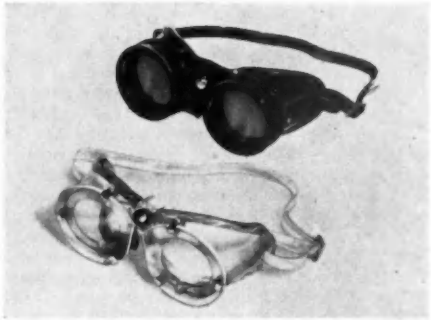
INCORPORATING a new design, the R.F.D. ventilated goggles are claimed by their makers, the R.F.D. CO., LTD., of Godalming, Surrey, to solve the "misting up" problem. Close inspection of these goggles supports this claim.

The experience of many industrial firms who have given these goggles a full practical test indicates that this new design should mean a new era of safety for workers who are exposed to chemical or liquid sprays, irritant dusts, sparks and injurious light rays.

Between the lenses and the periphery of the eye cup there is a narrow channel wide enough to permit air to pass across the front of the eye-cup, whilst the particles and moisture are kept out by (*a*) the extension of the lenses beyond the periphery of the eye-cup; (*b*) an inwardly directed flange on the forward edge on the latter, and (*c*) the absence of ventilation holes in the sides of the eye-cups.

Made from splinterproof, acid resisting plastics, R.F.D. goggles are available with clear or coloured lenses; total weight is 2½ ozs.

The welder's goggles made by the company employ the same principles and satisfy the same standard as the general-purpose model. They carry filter glasses to B.S. 679 and conform to the B.S. 1542/1949 "Equipment for eye and face protection during welding" and they bear the B.S.I. certified mark.



*The R.F.D. general purpose and welder's goggles*

## TRADE PUBLICATIONS

SOLDERING. Multicore Solders Ltd., Mellier House, Albemarle Street, London W.1, have long specialised in the production of high-grade high speed cored solders. A booklet just published by them gives details of "Ersin" and "Arax" multicore solders, and illustrates their many applications.

ELECTRICAL ACCESSORIES. List No. 52 published by A. P. Lundberg & Sons Ltd., a T.I. company of Credenda Works, Rood End Road, Oldbury, Birmingham, gives details of the ranges of high quality accessories this company produces.

LIGHTING FITTINGS. Many of the attractive lighting fittings made by Merchant Adventurers, Ltd., 43 Portland Road, London, W.11, are illustrated in the company's 1950 catalogue now available.

NICKEL COPPER ALLOYS. "K Monel" is the title of a new publication issued by Henry Wiggin and Co., Ltd., Wiggin Street, Birmingham 16, which gives comprehensive data on this material for the engineer designer.

TELEVISION MASTS. An example of the work carried out by the British Insulated Callender's Construction Co., Ltd. is the 750 ft mast for the Sutton Coldfield station of the B.B.C's Midland Television service. Designed and constructed by the company, the mast is shown in various stages of construction in a new leaflet issued by the company.

LIGHTING FITTINGS. "Mazda" fluorescent fittings are described in detail in two folders issued by the British Thomson Houston Co., Ltd., of Crown House, Aldwych, London W.C.2.

# Electronic Mill Control

## *Experience proves success of Tensioning Device*

IN view of the accuracy of control of machinery which can be obtained by using electronic control gear, the performance of the G.E.C. electronic equipment installed in the cold rolling section of the Ebbw Vale works of Richard Thomas and Baldwins, Ltd., is of considerable interest. The mill concerned is a three-stand, four-high tandem cold reduction sheet mill, and by the use of electronic control it has been made possible to roll on a thick-sheet mill thicknesses suitable for tin plate.

### *Arrangement of Mill*

The stands of the mill are so arranged that the strip is first uncoiled, passed through each set of rolls successively and finally recoiled. Each unit is speed controlled to maintain throughout a constant tension in the strip. Three 1,500 h.p. d.c. motors, controlled on the Ward Leonard system, power the stands, while to ensure strip tension after the last stand, the take up reel is power driven by a 400 h.p. d.c. motor. The electronic equipment is designed to ensure constant tension in the strip under all conditions.

Since the diameter of the reel increases as the strip builds up, there must be a reduction in motor speed but this entails a corresponding increase in motor torque if the strip tension is to be constant. Further, if for any reason there is a variation in mill speed, the motor torque must be adjusted to compensate for the acceleration or deceleration of the mass of the reel and the strip wound on it.

For a steady mill speed and constant tension in the strip, the horsepower developed by the reel motor will be constant irrespective of the reel diameter. At constant mill speed, the voltage of the busbar, supplying the mill and reel motors, will also be constant and, therefore, to maintain a constant horsepower and strip tension, the armature current must be constant. Since the armature speeds of the mill and reel motors are tied together by the strip, the armature current in the reel motor, and therefore the strip tension, may be kept constant at constant mill speed by variation of the motor field current.

Control of the reel motor is effected by a vibrating type regulator having three operat-

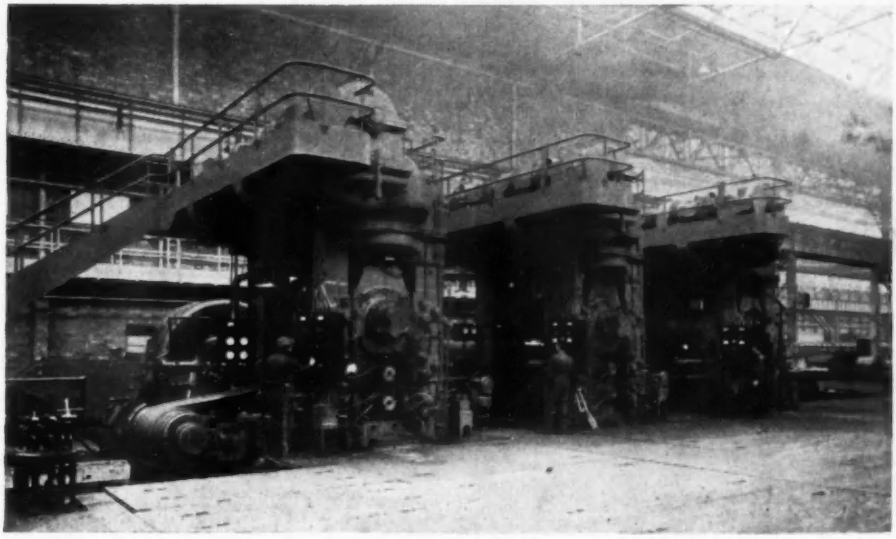


*Fig. 1—The four-high three-stand tandem sheet mill installed at Ebbw Vale*

ing coils. One coil is connected to a constant voltage supply through a variable resistor controlled by the mill operator. The second is connected across a shunt in the armature circuit and, therefore, carries a current proportional to the armature current, while the third is arranged to carry a current proportional to the rate of acceleration of the mill. The regulator is designed to balance when the algebraic sum of the ampere-turns through the three coils reaches a predetermined value. Since the ampere-turns through the first coil may be varied by adjustment of the series resistor, it will be seen that this resistor controls the armature current and so provides the tension setting for the reel motor.

### *Fine Control System*

In 1940, however, it was decided to impose a finer control on the reel motor during acceleration and deceleration of the mill. To achieve this, an electronic device (Figs. 2 and 3) was specially designed at the Witton Engineering Works of the G.E.C., to provide the energising current for the "acceleration" coil. As already stated, the control obtained by this means was found to be sufficiently accurate for the production of sheet for tinplate, a process in which the "acceleration" current in the relay exceeds the "tension" current and must therefore be controlled considerably more closely than was originally necessary.

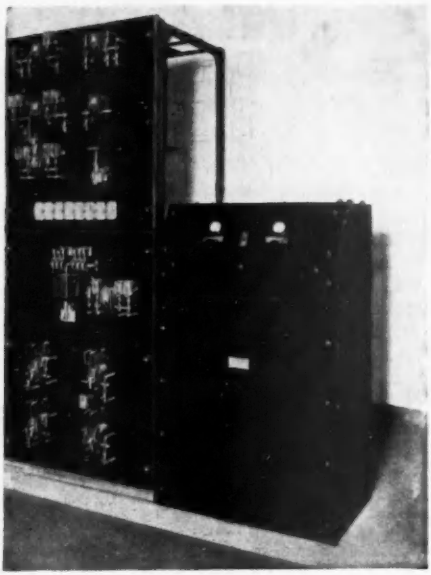


*Fig. 2—Front view of contactor board showing electronic control cabinet on the right*

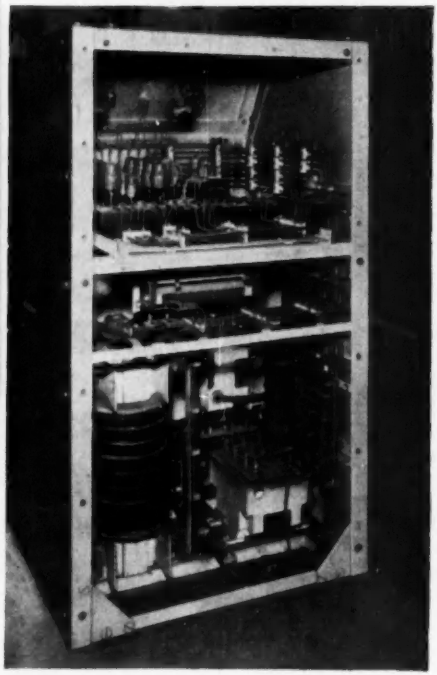


*Fig. 3—View of rear of electronic controller*

The signal proportional to acceleration is obtained from a choke, A, with two windings. The primary winding is energised by current taken from the d.c. busbar supplying the mill motors, considerable resistance being connected in the circuit to swamp the effect of the winding inductance and so ensure that the current is very nearly proportional to the busbar voltage and therefore to the speed of the mill. The design of the primary winding is such that the core of the choke, which has a large air-gap, is not over-saturated at full voltage and the core flux is thus proportional to the mill speed. Any change in speed will produce a variation in core flux and a voltage proportional to the rate of change of speed will be induced in the secondary winding.

### *Control Operation*

Since it takes approximately eleven seconds to accelerate the mill from threading speed to full speed, the rate of change of flux is small and, even with a large number of turns on the

secondary winding, the output voltage and power are very low. A two-stage, push-pull amplifier is therefore incorporated to increase the voltage and power supplied to the relay coil. The first stage valves are shown at B while the second stage C, consists of eight valves, four in parallel each side, all valves being standard types for easy replacement.

Since it is required to amplify what is, in effect, a d.c. signal, the anodes of the first stage are directly coupled to the grids of the second stage thus necessitating the provision of separate sources of anode supply for the two stages. The rectifier valves for these supplies are shown at D, and their associated supply transformers at E.

The outputs of the two sides of the second stage are fed to opposite ends of the relay "acceleration" coil which is centre-tapped so that its resultant magnetic effect is zero when the outputs are balanced. Each side of the output stage is biassed to give a very small anode current the effect of which is (1) to reduce the heating of the relay coil to a minimum and (2) to prolong the useful life of the valves. Adjustment controls, F, and milliammeters, G, are conveniently mounted on the front of the cubicle.

From the time of its installation, ten years ago, when electronic control of industrial machinery was in its infancy, this equipment has given the most satisfactory service and has materially assisted in maintaining a high output during a period in which steel production has been of vital importance to the nation.

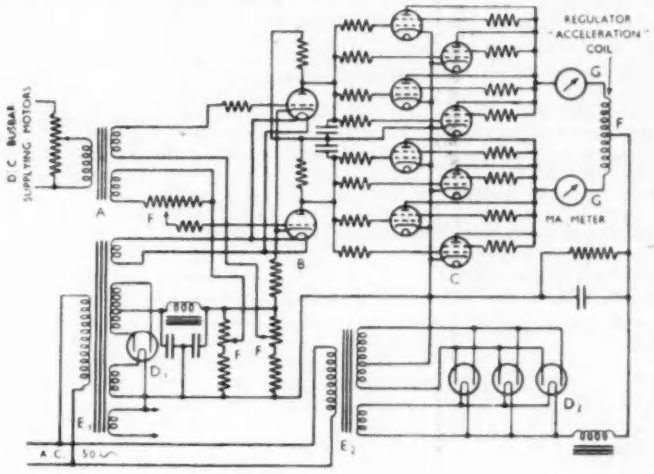



*Fig. 4—Schematic circuit diagram of electronic regulator to show method of operation*

# Surface Phenomena

## Kelvin's Work on the Phase-Boundary Effects

DELIVERING the forty-first Kelvin Lecture at the I.E.E. last week, Professor Rideal said that the scientific interest and achievements of Lord Kelvin covered many branches of science.

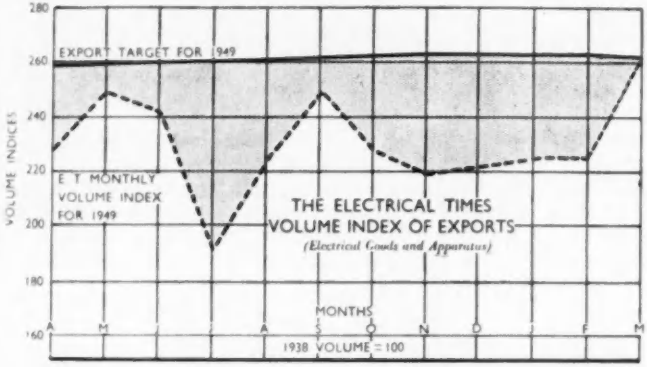
The surface tensions of liquids usually fell as the temperature was raised, and Lord Kelvin showed that there was in consequence an absorption of heat when the surface of a liquid was extended. This had led to many important deductions in the field of surface energy calculation. Calling attention to another phase of Lord Kelvin's activities, Professor Rideal recalled how Kelvin described a method of using a quadrant electrometer and a bridge method somewhat analogous to that already utilised by Wheatstone, to examine and prove the existence of a Volta potential difference between different metals.

The existence of a difference of potential at metal/metal interfaces was first implicitly recognised by Volta in 1808, but supporters of the chemical theory maintained that the Volta contact potential was itself due to chemical action. It was Kelvin who stoutly maintained the concept of the reality of the Volta potential. Utilising his quadrant electrometer he showed that there was, indeed, a potential difference between dis-similar metals when they were placed in the alternate quadrants and that that potential difference could be modified by oxide layers and other surface contaminants.

# EXPORTS AND IMPORTS

**EXPORT VOLUME INDEX**

**Trade returns for the third month of 1950 show that £7,384,490 was the value of the electrical goods and apparatus exported during that period. This is equivalent in volume to 260% of the 1938 achievement, which is the highest figure reached by this section of the electrical industry for over a year. It closely approaches the most recent export target figures which are available.**




EXPORTS of all electrical goods during the month of March reached the new high value of £11,856,779. Although spread over most items the most notable increase was that of the convertors, transformers, rectifiers, etc., group, whose exports again attained a figure of more than £2,000,000, being even slightly above the volume for January last. Of the heating and cooking goods exported, electric flat irons amounted to £49,861 of the value, cooking appliances totalled £111,623, and other heating appliances £50,994. Electric motors of between 1 h.p. and 250 h.p. totalling £450,590 in value, were exported during March, those from ½ h.p. to 1 h.p. amounting to £28,512, and below ½ h.p. £63,184. Of all items sent abroad last month, goods to a total value of £1,431,520 went to Australia, £1,111,655 to India, £946,596 to South Africa, £571,340 to New Zealand, £534,408 to Canada, while Russia took electrical equipment valued at £189,956.

| Description | Exports Value Month of March | | | Imports Value Month of March | | |
|---|---|---|---|---|---|---|
| | 1948 £ | 1949 £ | 1950 £ | 1948 £ | 1949 £ | 1950 £ |
| Telegraph and Telephone Wires and Cables— | | | | | | |
| Submarine | 2,441 | 30,255 | 90,576 | | | |
| Other | 503,309 | 651,963 | 862,984 | 16,822 | 5,011 | 2,935 |
| Rubber Insulated | 369,131 | 484,639 | 313,559 | | | |
| Insulated, other than Rubber | 728,464 | 1,068,995 | 901,771 | | | |
| Wireless Apparatus, including Valves | 776,462 | 843,663 | 894,822 | 42,473 | 58,679 | 225,817 |
| Telephone and Telegraph Apparatus | 736,734 | 1,250,729 | 1,559,928 | 7,456 | 26,239 | 9,908 |
| Electric Lighting Appliances, Accessories, Fittings and Parts:— | | | | | | |
| Bulbs and Discharge Lamps | 154,657 | 137,800 | 128,192 | 9,298 | 17,389 | 26,092 |
| Other Descriptions | 352,616 | 462,021 | 322,792 | 31,054 | 7,953 | 12,242 |
| Batteries (primary) | 66,186 | 97,736 | 94,935 | — | — | — |
| Accumulators, Portable | 199,787 | 199,474 | 245,243 | — | — | — |
| ,, Stationary | 43,253 | 36,922 | 69,228 | — | — | — |
| ,, Parts and Accessories | 39,835 | 90,483 | 45,780 | — | — | — |
| Electrical Cooking and Heating Appliances | 282,447 | 319,927 | 254,331 | — | — | — |
| Ammeters, Voltmeters, etc., and Parts | 83,367 | 109,440 | 107,018 | 27,074 | 16,476 | 28,760 |
| House Service Meters | 144,032 | 152,075 | 103,548 | | | |
| All Other Instruments | 80,092 | 91,294 | 107,422 | | | |
| Electro-Medical Apparatus | 26,876 | 48,265 | 38,471 | — | — | — |
| X-Ray Apparatus, etc. | 37,695 | 63,490 | 64,748 | 52,175 | 32,093 | 18,280 |
| Insulating Materials | 129,123 | 155,379 | 172,508 | — | — | — |
| All Other Articles | 285,003 | 479,745 | 445,135 | 48,581 | 40,212 | 149,782 |
| TOTAL OF GROUP | 5,314,969 | 7,115,039 | 7,384,490 | 235,031 | 204,052 | 473,806 |
| Electrical Machinery:— | | | | | | |
| Generators (not exceeding 200 kW) | 271,409 | 589,897 | 817,558 | 83,656 | 5,800 | 46,079 |
| ,, (exceeding 200 kW) | 132,625 | 292,799 | 266,142 | | | |
| Parts | 325,050 | 126,022 | 166,648 | | | |
| Motors | 531,482 | 897,646 | 696,775 | 35,756 | 40,389 | 62,558 |
| Convertors, Transformers, Rectifiers, Motor Control Gear, Switchgear, other machinery | 1,033,508 | 1,465,454 | 2,075,856 | 12,835 | 10,678 | 22,095 |
| Fans, Electrically and Power Driven | 67,181 | 149,137 | 155,167 | — | — | — |
| Vacuum Cleaners or Electrically Operated Appliances | 155,155 | 297,751 | 294,143 | 7,805 | 7,537 | 16,191 |
| TOTAL APPLIANCES AND MACHINERY | 7,831,379 | 10,933,745 | 11,856,779 | 375,083 | 268,456 | 620,729 |

# THE WEEK

## INDUSTRY *in news* COMMERCE

### *The Peak In News*

THE RECENT cold snap, with snow, sleet, and temperatures down to 36° F at 1 a.m. on Tuesday, came as an unwelcome surprise to the electricity industry. By itself, it would have been awkward enough, but its timing was doubly unfortunate since it involved a large space-heating load shortly after the winter restrictions on the industrial load, imposed by the Regional Boards for Industry, had been removed. In addition, the B.E.A. had some 1,500 MW (s.o.) of plant out on overhaul. Preliminary figures show that the potential peak load on Monday was 10,061 MW and the actual load carried 9,404 MW.

### *"Electrical Times" in Microfilm*

FOR MANY years bound editions of the ELECTRICAL TIMES have afforded valuable reference facilities to libraries all over the world. Now we are able to announce an additional service to libraries. Agreement has been reached with an American organisation, University Microfilms, to make available issues in microfilm form. The service will cover the current volume which started on January 5.

Storage of periodicals in libraries poses a problem because of their bulk and number. Under the microfilm plan copies are circulated as printed issues by libraries for two or three years, and then a microfilm edition of 30 or more copies is retained for permanent reference.

Microfilm sales are restricted to those subscribing to the paper edition, and the film copy is only distributed at the end of the volume year. Inquiries concerning purchase of the microfilm, supplied on labelled metal reels, should be made to University Microfilms, 313 N. First Street, Ann Arbor, Michigan.

### *Engineers Strive for Dollar Orders*

FOLLOWING closely upon the successful Motor Show in New York comes news of another determined British effort to win dollars. It is being launched by British tool, machine tool and scientific instrument manufacturers at the Canadian International Trade Fair in Toronto.

From May 29 to June 9, the largest display of its type ever exhibited in Canada, covering an area of over 35,000 square feet, will show the latest achievements of British engineering. Nearly 100 leading British manufacturers will place on view, among many other exhibits, 250 machine tools, powered and in action, as well as the most modern measuring equipment and scientific instruments.

The venture is all the more timely as, though Canada is hardly less short of U.S. dollars than Britain, the Canadian market is still largely dominated by the United States: in 1948, 58·5% of Canada's total imports came from the U.S., as against 11·4% only from Britain. The disparity is even more striking when considering the figures for machine tools alone: according to the Gilpin Report, Canada imported in 1947, £5,350,000 worth of machine tools from the U.S., and only £197,000 from the United Kingdom. The exhibition will show that Britain can supply Canada with practically all the tools, machine tools and scientific instruments she has bought up to now from her southern neighbour—in qualities and at prices comparing very favourably with those of U.S. goods.

### *Television Sales Drop*

R.T.R.A. Sales Index for February shows little change, compared with January, as far as radio is concerned. Television shows a drop from an average 9·09 sets per shop to 7·04.

Figures for the last two months are:—

| *Month* | *Average Number of Sets sold per Shop* | |
|---|---|---|
| RADIO | | |
| | 1950 | 1949 |
| January ... ... ... | 11.94 | 11.79 |
| February ... ... ... | 11.89 | 8.65 |
| TELEVISION | | |
| | 1950 | 1949 |
| January ... ... ... | 9.09 | 5.68 |
| February ... ... ... | 7.04 | 4.79 |

Sales in the case of both radio and television are appreciably better than last year. The average retail price per radio receiver sold is slightly less than last year, but in the case of television the average price paid by the customer is about £9 less than a year ago.

### *The First Half-Century*

Dear Sir,—We beg to say that we have had a little dispute with a portion of our winders who, despite the fact that they are being paid 9½d. an hour, which is at least 15% higher than the standard rate in the country, thought it advisable, seeing that we were busy, to make still better terms for themselves. We have, we are thankful to say, got rid of some of these greedy gentlemen and are pleased to say that though our wages have been reduced some 10% since their departure, our output has gone up in the same proportion. Yours very truly, D. Bruce Peebles and Co.—*From our issue April 26, 1900.*

*In the thriving old town of Stevenage, Metrovick "S.O. Fifty" lanterns now light the Great North Road which forms part of the main thoroughfare. The concrete columns have a special red finish to blend with the red bricks of surrounding premises*

*Special lighting fittings were designed by the Holophane Co., and installed by Phoenix Electrical Co. (London) Ltd., in Morgan Crucible Co.'s new Neston factory. Adapted reflector-bowl pendants have been mounted direct on the concrete purlins*

## *Salary Agreement*

IN OUR notes on the new salary agreement for administrative and clerical staff in the electricity supply industry, in April 6 issue, reference was made to only one of the negotiating organisations. We should make it clear that the Transport and General Workers' Union, the General and Municipal Workers' Union, and the Clerical and Administrative Workers' Union were also involved in the discussions which resulted in the new agreement.

## *Export Progress*

SALES of Ersin multicore solder to U.S.A. have for some months now been at a rate exceeding a quarter million dollars a year, the company has just announced. It is believed that this volume of export sales to U.S.A. is among the greatest made by any British manufacturer associated with the radio industry. Commenting on this rapid development of U.S.A. business, Mr. Richard Arbib, managing director, said : "We attribute the results obtained as being due to the fact that although U.S.A. cored solder makers together make more cored solder than all other countries in the world combined, they do not specialise in the manufacture of high quality activated flux cored solder such as is required for the many intricate wiring processes in connection with television receiver high-speed manufacture.. The demand for our products from U.S.A. has been so great that our sales during the past three months have been limited entirely by our manufacturing capacity."

Since the war no member of Multicore Solders Ltd. has visited U.S.A. Sales have been made through distributors in New York, but because of increased business a company—Multicore Sales Corporation—has now been formed, with offices at 164 Duane Street, New York 13. Multicore will be exhibiting at the Chicago Parts Show which opens at Stevens Hotel, Chicago, on May 22.

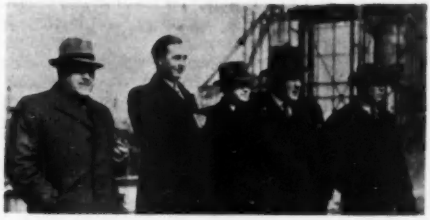
*Redecorated, with a new lighting scheme—the Egyptian Hall in Mansion House*

## *Lighting Egyptian Hall*

AS BRIEFLY reported in last week's issue, the Egyptian Hall of the Mansion House has been redecorated and fluorescent lighting installed. The installation was carried out by Girdlestone and Co. Ltd., who used special fittings made by Courtney, Pope (Electrical) Ltd. Some 32 cornice units were required and 128 lamps were used in this part of the installation. To give the required colour effect over the beautifully decorated ceiling, the fittings contain "Warm white" lamps supplied by Thorn Electrical Industries, Ltd.

Below the gallery 152 lamps have been installed in the existing coves which

are built into the sides of the decorative beams. Cost of the renovation has been met from the private funds of the City of London.



*At the Huncoat site (l. to r.): Mr. A. Goward, Mr. Anthony Greenwood, M.P., Mr. H. Coward, Alderman Harry Hynd, M.P., and Mr. C. L. Jackson*

## *Clock in Here*

IF YOU are in London and want to know the time, or more particularly the latest methods of keeping time, why not visit the new showroom of English Clock Systems, Ltd. On the second floor at Speedometer House, 179-185 Great Portland Street, W.1, the industrial branch of Smith's English Clocks, Ltd., have just opened a display of their world-famous timekeeping equipment.

A unique working demonstration panel, for instance, has two master clocks operating a number of slave circuits with dials, time recorder, bell signal control clock with audible signals. It clearly shows, in compact form, equipment that may be dispersed over many acres when in actual use. Also on show are many examples of outdoor advertising clocks, both double- and single-sided, which may be operated from a synchronous movement or from a master clock. The now well-known "Autoprint" and "Leverprint" time recorders are on show, together with a range of minute and seconds timers.

## *M.P.s visit Huncoat*

TO SEE for themselves how work is progressing, two M.P.s—Alderman Harry Hynd (Accrington) and Mr. Anthony Greenwood (Rossendale)—recently visited the site of the N. Western Division's new Huncoat generating station near Accrington. They were met by Mr. H. Coward, generation (operation) engineer, No. 1 subdivision, and Mr. A. Goward, site engineer.

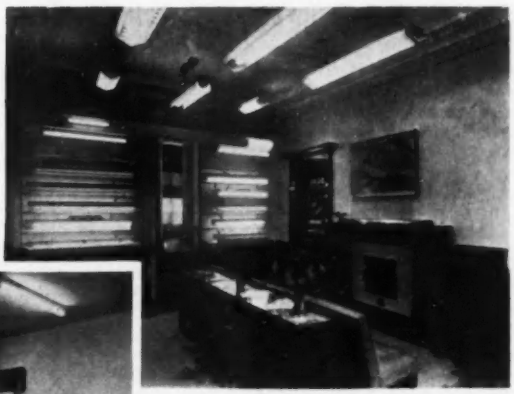
After an inspection of the site, which included being taken to the top of the cooling tower on a builder's lift, the visitors were shown over the Whitebirk, Blackburn, generating station.

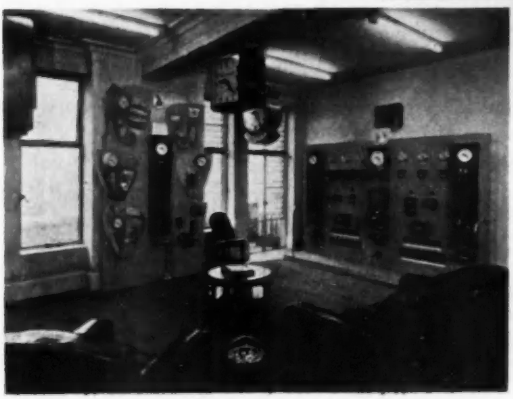
## *Simplex discuss Sales*

SIMPLEX ELECTRIC CO. recently held their annual sales conference at Ashorne Hill, near Leamington Spa. Attended by all the company's branch managers and sales representatives, production, development and head office executives, the conference was addressed by Mr. A. G. E. Briggs, managing director; Mr. C. Lacy Hulbert, technical director; Mr. A. G. Jones, works director, and other executives of the company. Mr. E. G. Plucknett, commercial director, presided throughout the conference.

## *Electricar Helps T.V. Sales*

AVERAGING about 35 miles a day, a 10 cwt Morrison Electricar delivery vehicle owned by George Watson of Winchmore Hill, London, has





*Above: The recently opened showrooms of E. K. Cole, Ltd., and Ekco-Ensign Electric Ltd., at their Glasgow depot, 26 India Street, Glasgow, C.2. Radio and lighting products, and a range of Thermovent electric space heaters are displayed together with typical specimen mouldings of the Ekco Plastics Division.*

*Left: Section of English Clock Systems, Ltd.'s new showroom in Great Portland Street, London, W.1.*

*With a ladder for T.V. mast installations, this electric van is used for radio deliveries*

proved a great success for T.V. and radio installation work. Quiet and smooth running with a roomy, square interior, uninterrupted by wheel arches, it is a practical choice for this type of delivery.

Usual complement of T.V., radio and radiogram sets is 15, and the number of installations completed in a day averages 20. In addition the vehicle is used for carrying all kinds of electrical home appliances including irons, vacuums and washing machines.

## *Southern Meter Engineers' Dinner*

LONG noted for the jovial, informal atmosphere which pervades the function, this year's annual dinner of the Southern Meter Engineers' Technical Group of the E.P.E.A., held on Friday last, proved no exception. An encouraging sign, too, was the large attendance—an increase over the previous year. As in the past, the speeches were interspersed with items of entertainment, which again included a monologue by Charlie Pheby. The toast of "The Guests" was proposed by Mr. A. A. Yardley, A.M.I.E.E., chairman, who thanked those who had presented papers during the past session. To this Mr. W. T. O'Dea, B.Sc., A.M.I.E.E., replied in inimitable style. Striking a more serious vein, Mr. J. F. Wallace, in proposing the toast of "The Chairman," stressed the part the E.P.E.A. had played in the formulation of the 1947 Act, and urged members to be ready to express their views when the opportunity arose. In reply, Mr. Yardley paid tribute to the work of the other committee members. Amid this genial company, we spent a thoroughly enjoyable evening.

## *London Students' Joint Meeting*

WITH "Power Station Work" as its central theme, the annual joint meeting of London Students' Sections of the three principal engineering institutions attracted an attendance of over 200 at the I.E.E. building last week. The first paper read was "Civil Engineering Aspects of Power Station Construction," by Mr. D. H. Gladwyn, stud. Inst. C.E. Foundation problems and cooling water requirements were discussed, with particular reference to Kingston power station, a Near East station, and a riverside plant in the Far East.

The Mechanical's contribution came from Mr. N. E. Pitcher, Grad. I.Mech.E., who spoke on "Power Station Boiler Plant," and reviewed advances in design since before the war. He devoted particular attention to problems of operating the unit system for boilers and alternators. Finally in the evening came Mr. F. R. Bishop, stud. I.E.E., who took "Power Station Auxiliary Systems" as his subject, and dealt with typical layout and power requirements. A general discussion concluded the meeting.

## *Lighting for Film Production*

FILM production calls for varied types of lighting technique—especially in studio projection theatres where films are being screened almost continuously. At their Elstree studios, Associated British Picture Corporation, Ltd. have three such theatres, and G.E.C. have just supplied lighting equipment for the new buildings.

In the Dubbing and Preview theatres the auditorium lighting is provided by Osram Warm White cold cathode tubing concealed in special lighting coves. The tube ends with the electrodes turned back so that their lighting lengths are continuous. General lighting comes from a double run of cold cathode tubes in each of the four lighting coves, totalling 712 ft of tubing.

The Preview theatre is lighted on similar lines with concealed cold cathode tubing, but with a single run in each of the four coves, 396 ft of tube in all. In the Scoring theatre a high level of illumination is provided by three rows of special reflector fittings, each with four runs of cold cathode tube, totalling 618 ft. Electrical contractors were Barlow and Young, Ltd.

## *New Brook Sales Aid*

BROOK MOTORS LTD. have just produced an attractive showcard for their "Cub" fractional h.p. motors. Silk-screened in five colours, the card is quickly and easily set up for display on the electrical dealer's counter or in the window. Cards may be obtained from the Publicity Department, Huddersfield, on request.

## *Gifts to Employees*

EIGHT employees of Brook Motors Ltd., of Huddersfield, received gifts at the annual sales conference to mark their completion of 25 years' service with the firm. A total of 109 employees of the firm have now received such gifts.

Mr. John L. Brook, managing director, presided over the function and complimented the following recipients: Messrs. L. Beaumont (foreman, repairs dept.), J. Goddard (repairs dept.) and L. Hinchcliffe (charge-hand, large rotor winding section), who received gold pocket watches; C. Broadbent (charge-hand, standard motor fitting dept.), R. Walkden (branch manager, Liverpool), W. Ward (Sheffield branch), Elwin Brook (charge-hand, large motor fitting dept.), who received gold wrist watches; and L. Haslett (foreman, fitting dept.) who received a gramophone record cabinet.

Presenting the gifts in the absence through ill-health of the chairman, Mr. Ernest Brook, the vice-chairman, Mr. F. V. Brook, said he, too, hoped to complete 25 years' active connection with the firm very soon.

### *Presentation to a Firm*

SOME historical developments in the spark testing of rubber insulated cables are brought to mind by the recent presentation of a spark testing apparatus to W. T. Glover and Co. Ltd. The presentation was made by Mr. H. M. Crellin, present manager of the testing department, to the chairman, Mr. Martin Harvey.

Spark testing was first tried out in the company's works during the 1914-18 war by Mr. Crellin. As the apparatus was not sufficiently reliable experiments continued until 1931, when an equipment made by Mr. J. L. Entwistle in U.S.A., was adopted. Mr. Crellin maintained close contact with the maker and was able to effect some standardisation of the American and British spark testing processes.

Last January, in recognition of his work, he was presented with a sensitivity and voltage calibrator by the General Engineering Co., Radcliffe Ltd., the British agents of Mr. J. L. Entwistle. It is this calibrator that Mr. Crellin has now passed on to his firm.

### *Zambesi Electricity Scheme*

IN the House of Commons last week the Secretary of State for Commonwealth Relations was asked when agreement was expected on the timing of the scheme to generate electricity at Kariba Gorge. Mr. Gordon-Walker replied that a considerable amount of data had been collected and was being submitted to a panel of consultants, who will report to the Inter-Territorial Hydro-Electric Power Commission on the practicability of a power scheme. This report was not expected for some months, and thereafter the Commission would present its own report and recommendations to the two Governments.

### *New H.Q. for S. Wales Division*

PLANS for a new divisional headquarters for the B.E.A. in Cardiff were mentioned by Lord Citrine when he recently visited the city. At present the staff are temporarily accommodated in eight ex-R.A.F. huts linked by a makeshift corrugated iron corridor.

Addressing the 140 men and women who carry out the administrative work of South Wales division, Lord Citrine said that the central authority had approved a scheme for a permanent divisional headquarters with office accommodation and a canteen.

Lord Citrine expressed the hope that Britain would be able to build the finest electricity service in the world.

"That is not an exaggerated hope," he said. "Our technicians and inventors are certainly at least abreast of any I have seen in any country in the world. At the moment we are planning 25 years ahead. We are now using some 29 million tons of coal a year. By 1970 we shall be using something like 60 million tons a year."

*The sensitivity and voltage calibrator presented to W. T. Glover and Co. Ltd.*

## *News in brief*

On Tuesday next the E.D.A. Sales Management Conference opens in Caxton Hall, Westminster. At the conclusion there will be a general discussion in the Connaught Rooms, Great Queen Street, on May 5.

Changes in the purchase tax on commercial vehicles as announced in the Budget speech have now been published in Notice No. 78P by the Commissioners of Customs and Excise.

First new electricity service centre in North Devon since vesting date has just been opened at Combe Martin by S.W. Board.

Mrs. J. D. Peattie, wife of Mr. J. D. Peattie, deputy chief engineer (generation), B.E.A., launched *Bodmin Moor*, a single-screw steamer, for B.E.A., from the Wear dockyard of S. P. Austin and Son Ltd., last week.

President of the Electrical Trades' Commercial Travellers Association, Mr. N. V. Everton, is appealing for new members. Honorary secretary is Mr. A. J. Clark, 14 Denmark Road, Carshalton, Surrey.

Although their Mulberry Street, Manchester, works were recently destroyed by fire, the Insuloid Manufacturing Co. are maintaining production as far as possible.

After holding the Middlesex Lunch Time League Division I championship cup for two consecutive years, G.E.C. lost to the Cable and Wireless team, known as the "Exiles," by 11 goals to 5 in the final held at Lincoln's Inn Fields last week.

# *Electric Supply News*

**Eire**

In the Dail last week, Mr. . Gilligan, Minister for Finance, said the amount advanced from the Central Fund for rural electrification during the financial year 1949-50 was £1,050,000. The corresponding provision for 1950-51 would be indicated in the Budget statement. Replying to questions on the progress of the Scheme, the Minister for Industry and Commerce stated that the question of the percentage rate of subsidy for rural electrification was at present under consideration. There was no restriction on the scheme by reason of the fact that higher capital subsidy was required to enable 69% of the dwellings to be connected. Supply had not been refused to any dwellings by reason of the present statutory limitation of the capital subsidy to 50%.

**Glasgow**

At the recent meeting of the Corporation Housing Committee, protest was made at the charges of the South-West Scotland Electricity Board for lead-in mains to new houses. It was stated that the present price was £10, whereas the Corporation undertaking charged £3 2s. 6d. prior to vesting day. A member pointed out that the new price would mean that at the present rate of building additional expenditure would be between £25,000 and £30,000. On his motion, the committee adopted a resolution demanding that the Board be asked to withdraw their increased charges.

**Larne**

The Borough Council has refused an application of the Northern Ireland Electricity Board for permission to install under-eave wiring for the lighting of Main Street.

**Leek (Staffs.)**

A start has been made on the conversion of the electricity supply from d.c. to a.c. The scheme, which affects 5,000 buildings, will take between four and five years to complete.

**Merseyside and N. Wales**

The Board has evolved a fixed flat rate scale (excluding the cost of materials) for dealing with faults on consumers' premises. For each fault notified between 8 a.m. and 5 p.m. the charge will be 4s., between 5 p.m. and 11 p.m. 7s., and between 11 p.m. and 8 a.m. on the basis of the actual cost incurred. These charges apply only to temporary measures necessary to ensure the safety of the supply.

**Orkneys**

Constructional scheme No. 53 of the North of Scotland Hydro-Electric Board has now been approved by the Secretary of State for Scotland. The scheme provides for the construction of a 7,000 kW diesel generating station at Kirkwall, to meet the growing demand in the Orkney Islands. Estimated cost of the scheme is £281,000.

## LIGHTING SCHEMES

**Banstead.**—The Council has approved in principle the provision of street lighting throughout the urban district under a scheme to be carried out on a seven-year plan.

**Bridlington.** The Highways Committee is considering a quotation of the Yorkshire Electricity Board for the conversion of street lighting on, and immediately adjacent to the sea front, using 300 W tungsten lamps. The committee has also recommended that all new street lighting should be of the sodium type.

**Brixham.**—The U.D.C. has rejected a proposal for decorative lighting.

**Douglas, I.O.M.,**—A report by the borough electrical engineer on a long term plan for the improvement of the public lighting of the town has been passed by the Electricity Committee to the Finance Committee.

**Liverpool.**—The City Lighting Committee has decided to postpone new street lighting work costing £14,000 and to reduce maintenance costs by £1,000.

**Lanarkshire.**—The C.C. has approved a scheme to provide electric street lighting for nine villages at a cost of £12,870.

**Newport (I.O.W.).**—The T.C. has agreed to a recommendation that electricity be adopted for street lighting in place of gas.

**Ross-on-Wye U.D.C.**—The Council has agreed in principle that the streets should be lit by electricity instead of gas. The Midlands Electricity Board has been asked to submit a scheme.

**Rotherham.**—The Highways Committee has recommended that the lighting in the centre of the town be converted from gas to electricity.

**St. Asaph.**—The Parish Council is applying to the Welsh Board of Health for a loan of £3,000 for electric street lighting.

**Stretford.**—The Highways Committee has approved a scheme for the lighting of Questinghouse Road, at a cost of £2,200.

**Thetford.**—The town is to adopt electric street lighting.

**Weston-super-Mare.**—To assist the Borough Council in its endeavour to introduce more modern forms of street lighting, the Works Committee has decided to send a party of councillors to Rugby, to inspect, and report upon, experimental lighting installations in that town.

**Wigan.**—The R.D.C. is applying for sanction to borrow £2,000 for an additional street lighting scheme.

**Woolwich.**—The B.C. is to relight Sherard Road, Eltham, with mercury vapour lamps at an estimated cost of £1,631.

# Company Activities

**W. Canning & Co.**

Net profit for 1949, after providing for taxation, was £173,742 (*£186,690*). Taxation absorbed £203,998 (*£228,834*). To general reserve £97,288 (*£125,000*), contingencies £10,932 (*nil*), to meet increased cost of replacement of fixed assets £25,000 (*nil*), and there is final Ordinary dividend of 3d. per 5s. unit plus bonus of 10½d. per 5s. unit, making 27½%, absorbing £8,250 (*same*), and bonus £28,875 (*same*).

**Ever-Ready Trust**

Balance of revenue for the year to March 31, after allowing management expenses, but before taxation, was £35,365 (*£33,454*). Taxation absorbs £16,591 (*£13,310*), leaving a net revenue balance of £12,723 (£16,077). Final Ordinary and Deferred dividend 6% (*8%*), making 11% (*same*), absorbs £18,150.

**Hall Telephone Accessories**

Trading profit for 1949 after operating expenses and development work, £82,813 (*£79,077*). Dividend is again 10%. Directors' remuneration takes £10,596 (*£9,500*), depreciation £11,915 (*£13,302*), pensions and life assurance contributions £2,726 (*£443*), audit fee £367 (*same*), leaving net profit £56,209 (*£55,465*), plus £12,740 (*nil*) E.P.T. recovered and £2,171 (*£5,215*) over provisions in previous years. With £25,893 (*£26,653*) brought in, there is £97,013 (*£100,366*) available (including £13,123 price adjustments on Government contracts to December 31, 1947). To tax £28,846 (*£31,732*), investment reserve £27,500 (*£25,000*), dividend £17,741 (*same*), leaving £22,926 carried forward.

**W. T. Henley's Telegraph Works Co.**

Group profit (subject to audit), after all charges and provisions including tax, was £814,402 (*£768,956*). U.K. taxation charged amounted to £814,402 (*£768,956*). There is a final Ordinary dividend of 10% and bonus 5%, making 20% (*same*). In arriving at the profit £105,000 (*£13,740*) has been charged as provision for contract maintenance, and £51,698 (*nil*) and £14,513 (*£191,869*) has been credited in respect of receipts of earlier years and profit on realisation of investments respectively. To general reserve £255,000 (*£125,000*), replacement of buildings, plant, etc., £200,000 (*£100,000*), fluctuations in prices of materials £25,000 (*£157,000*), dividends £183,700 (*same*), leaving £961,196 (*£866,313*) carried forward.

**Hoffmann Manufacturing Co.**

The preliminary announcement shows a group net profit for 1949, before tax, of £682,864 (*£743,788*). Provision for taxation amounts to £360,942 (*£385,930*), leaving group net profit of £321,922 (*£357,858*). The sum of £41,636 (*£32,081*) is retained by subsidiaries, leaving net profit of parent company £280,286 (*£325,777*). To benevolent fund £10,000 (*same*), stock reserve £50,000 (*same*), and fixed asset replacement reserve £155,000 (*£175,000*). Debenture interest takes £5,385 net (*£5,633*), 7½% Preference dividend £20,625 (*same*), and Ordinary dividend £37,500 (*same*). A surplus of £1,776 (*£27,019*) is added, making the carry forward of £174,135 (*£172,359*).

**Parnall (Yate) Ltd.**

Group profit for 1949 was £80,202 (*£36,188*). This includes special credits and after providing for all development expenditure associated with new products, and including taxation transfers. Dividend of 5% (*same*), payable on May 25.

**Sangamo Weston Ltd.**

The balance on profit and loss account shows a profit of £116,144 (*£113,293*) for 1949, after charging tax, depreciation and writing down patents. With £333,974 (*£235,840*) brought in there is £450,118 (*£349,113*) available. To depreciation and amounts written off fixed assets £37,873 (*£44,952*), written off patents £370 (*£290*), reconstruction and alterations £2,729 (*£2,372*), sports ground expenditure £1,840 (*nil*), directors' fees £1,200 (*same*), audit fee £850 (*£750*), interest £196 (*same*), expenses re increase of capital £1,179 (*nil*), profits tax £26,000 (*£30,500*), income tax £86,883 (*£113,293*), to capitalisation of undistributed profits £157,500 (*nil*), Ordinary dividend of 10% £17,325 (*£15,159*), leaving £275,293 carried forward.

**Laurence Scott & Electromotors**

Preliminary statement shows a net profit for 1949, of £134,403 (*£104,645*), after allowing all charges, including tax. Dvidend on "A" and "B" Ordinary of 12½% (*same*).

**Senior Economiser Ltd.**

Trading profit for 1949 was £105,968 (*£57,336*), plus investment income £400 (*£570*), making £106,368 (*£57,906*). To depreciation £5,440 (*£1,050*), directors' remuneration £7,325 (*£5,801*), audit fee £300 (*£200*), pension and life assurance scheme £1,471 (*£1,391*), leaving £91,832 (*£49,464*). To U.K. tax £55,195 (*£27,985*), bonus issue expenses £635 (*nil*), leaving £36,002 (*£21,479*). Brought in £11,575, less amount applied in issue of bonus shares £11,575, leaving nil (*£5,496*), transfer from tax reserve nil (*£27,500*), over-provision for tax no longer required £11,218 (*nil*), making £47,220 (*£54,475*) available. To dividends £17,325, general reserve £18,425 (*£27,500*), leaving £11,470 carried forward.

**Dividends Declared**

*British Electric Resistance Co.* Interim dividend of 5% (*same*).

*Radio Rentals.* Interim dividend of 10% (*same*), on increased capital.

*Rawlplug Co.* Final Ordinary dividend 35%, making 45% (*both same*). Net profit £158,277 (*£155,751*).

# Commercial Information

## CONTRACTS OPEN

### HOME

**Apr. 28.—Altrincham T.C.** Installation of street lighting on Stamford New Road-Railway Street (A538) from Barrington Road southwards to the Downs. Borough Surveyor, Town Hall, Altrincham. Deposit £2 2s.

**Apr. 28.—Belfast T.C.** 6,600 V and 400 V auxiliary switchgear and accessories for Harbour power station. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-upon-Tyne 1. Deposit £5 5s. (See our Mar. 23 issue.)

**Apr. 28.—Manchester.** New electrically operated passenger lift for College of Technology. The Chairman, College of Technology Sub-committee, Education Offices, Deansgate, Manchester 2.

**Apr. 28.—Reigate T.C.** Electrical rewiring of Town Hall. G. G. Sanderson, Borough Surveyor, Town Hall, Reigate. Deposit £2. (See our Apr. 6 issue.)

**Apr. 28.—Sowerby Bridge U.D.C.** Alternative tenders for heating "Beech Royd," Beech Rd., by electricity. J. Normenton, Engineer and Surveyor, Council Offices, Sowerby Bridge. Deposit £1 1s.

**Apr. 29.—Manchester T.C.** Electrical installation for applied science block to be erected at Newton Heath Technical School, Newton Heath. City Architect, Town Hall. Deposit £1 1s.

**May 1.—Blackpool T.C.** 750 yd cable. T. T. Jones, Town Clerk, Town Hall, Blackpool. (See our Apr. 20 issue.)

**May 1.—Metropolitan Water Board.** Five electrically driven inclined spindle low lift pumps for pumping station at Chingford South Reservoir. Chief Engineer's department (Room 122), Offices of the board, New River Head, Rosebery Avenue, E.C.1.

**May 1.—Hitchin U.D.C.** Electrical installation for 28 houses on Purwell Lane estate. Surveyor, Council Offices, Brand Street, Hitchin. (See our Apr. 13 issue.)

**May 1.—N. Scotland H.E. Board.** Erection of 8¼ miles of 33 kV single-circuit wood pole overhead lines near Killin, Perthshire. Engineers: Merz and McLellan, 39 Northumberland Street, Edinburgh 3. Deposit £1 1s. (See our Apr. 6 issue.)

**May 1. — N. Scotland H.E. Board.** 11 kV and lower voltage single circuit wood-pole overhead distribution lines in the parish of Kilmarnock, Dumbarton. Engineers: Merz and McLellan, 39 Northumberland St., Edinburgh 3. Deposit £1 1s. (See our Mar. 30 issue.)

**May 1.—Stockport T.C.** Electrical engineering work for conversion of Heaton Lane tramways depot into omnibus depot. E. B. Baxter, general manager, Transport Department, Mersey Square, Stockport.

**May 2.—Kirkcaldy T.C.** Electrical work for 16 houses to be erected at Hendry Crescent. Measurers, J. Gentles and Son, 162 High Street, Kirkcaldy.

**May 3.—Leitrim C.C. (Eire).** Electrical installation in proposed new general hospital at Manorhamilton, including E.S.B. service and main switchgear, lighting, service plugs, power, sterilising and cooking installations and equipment, call system, fire alarms, telephones and electric laundering. Consulting Engineers, J. A. Kerry and Partners, 44 Kildare Street, Dublin. Deposit £15 15s.

**May 4.—Romsey and Stockbridge R.D.C.** Electrical installation to following dwellings and consistin of lighting and power circuits, for the R.D.C.: Site No 2, Awbridge (12 dwellings); site No. 8, Lockerley (24); site No. 13, Stockbridge (8); site No. 15 Over Wallop (20); site No. 16 Nether Wallop (16). W. A. Tanner, clerk, R.D.C. Offices, Duttons Rd., Romsey. Deposit £1 1s. for each site.

**May 5.—Cardiff.** Twelve months supply of electric lamps and fittings. Supplies Officer, City Isolation Hospital, Canton, Cardiff.

**May 5.—Sheffield T.C.** Installation of electrical services to 342 houses being erected on Ballifield Hall estate. Town Clerk, Town Hall, Sheffield. Deposit £1 1s.

**May 8.—Glasgow.** Year's supply of electric lamps for Western Regional hospital board. Secretary, 64 West Regent St., Glasgow C.2.

**May 10.—Manchester T.C.** Supply of electric lamps. General Manager, Corporation Transport Department, 55 Piccadilly, Manchester 1.

**May 11.—Cheadle and Gatley U.D.C.** Year's supply of street lighting lamps, standards and fittings. G. P. Stanley, Engineer and Surveyor, Town Hall, Bruntwood Cheadle, Cheshire. (Advertised in this issue.)

**May 12.—Belfast T.C.** 33 kV and lower voltage transformers and $CO_2$ firefighting equipment. Merz and McLellan, Engineers, Carliol House, Newcastle-upon-Tyne. Deposit £5 5s. (See our Apr. 13 issue.)

**May 12.—N. Riding Education Committee.** Electrical installation at new county primary school at Saltburn-by-the-Sea. F. Barraclough, Secretary, Education Offices, County Hall Northallerton.

**May 12.—Walton and Weybridge U.D.C.** Supply delivery, and erection of electrically-driven sewage pumping plant at Apps Court pumping station. Engineer and Surveyor, Council Offices, Walton-on-Thames.

**May 13.—Lincoln C.C.** Electrical work at Stubton Hall, near Newark. Council's Consulting Engineers, E. G. Phillips Son and Norfolk, Arskus House Annesley Grove, Nottingham. Applications by Apr. 28.) (See our Apr. 0 issue.)

**May 20.—Annan T.C.** Provision of 1[illegible] tubular steel columns, 25 brackets and 28 lanterns, with 240 W mercury electric discharge lamps; erection of 22 columns and installation of equipment on trunk road A75. A. Knox, Town Clerk. Town Hall, Annan, Dumfriesshire. (See our Apr. 20 issue.)

**May 20.—Widnes T.C.** Supply and erection of approximately 4.7 miles of street lighting. Borough Surveyor, Town Hall, Widnes.

**May 23.—Belfast T.C.** Stud welding gun. Transport Department, Sandy Row, Belfast.

**No date stated. — Crayford U.D.C.** Electrical installations for 47 dwellings for part one of housing scheme No. 22. Engineer and Surveyor, Town Hall, Crayford, Kent. (Applications by Apr. 29.) (See our Apr. 20 issue.)

**No date stated.—Bradford T.C.** Electrical installation at Woodroyd school. Secretary, Education Committee.

**No date stated.—Breconshire C.C.** Electrical installation at Tymar Home Office school, Gilwern, near Abergavenny. H. C. W. Strickland, County Architect, Rhyd Offices, Brecon. Deposit £5. 5s. (Applications by Apr. 28.)

**No date stated.—Lanark C.C.** Electrical work for proposed police station and houses at Caldercrux. County Architect, W. R. Watt, 34 Albert St., Motherwell. (Applications by Apr. 29.)

**No date stated.—Macduff T.C.** Electrical installation for 12 houses at Law of Doune site. J. Black, Town Clerk, Town Clerk's Office, Macduff.

**No date stated.—Salop T.C.** Installation of electric lighting and power at Albrighton primary school (phase 1). Jackson and Edmonds, Architects, 65 New St., Birmingham 2.

## OVERSEAS

**May 2.—Mysore.** Feeder regulators for Bangalore. Six 50 or 75 amp, six 100 or 150 amp., four 600 V. Trade Commissioner for Mysore, 532 Grand Buildings, W.C.2. B.o.T. (Ref. CRE (IB) 49651/50).*

**May 3.—Brisbane.** One 30 V alkaline battery, and one trickle charging set. Secretary, State Electricity Commission, Scottish Union House, Eagle St., Brisbane. B.o.T. (Ref. CRE (IB) 49674/50).*

**May 22.—Buenos Aires.** Four diesel electric units of approx. 2,000 kW each together with spares for thermo-electric station "Sacta." Argentine Ministry for Industry and Commerce (Direccion General de Agua y Energia Eletrica). Direccion de Talleres y Suministros, Calle Lavalle 1556, Buenos Aires.

**May 22.—Montevideo.** 8,300 metres single conductor wire, 91,000 metres twin conductor wire, 19,500 metres triple conductor wire, all 220 V. Usinas Electricas y Telefonos del Estado, Montevideo, Uruguay. B.o.T. (Ref. CRE (IB) 50238/50).*

**May 22.—New South Wales.** Ten 2,500 kVA and seven 5,000 kVA transformers 66/11-6.35 kV, 3 ph, 50 c/s, with on load tap changing equipment in accordance with Department of Public Works, New South Wales, Specification No. E.37-49/50. Agent General for New South Wales, 56 Strand, W.C.2. B.o.T. (Ref. CRE (IB) 50055/50).*

**May 25.—Tangier.** 100 automatic telephone receivers, table model, and 200 wall model. Telefonica de Tanger S.A., Tangier. B.o.T. (Ref. CRE (IB) 49369/50).*

**June 6.—Wellington.** 110 kV outdoor switchgear and structure for Mangahao power station. Contract 148. State H.E. Dept., Wellington. Deposit £100; bond £300.

**June 7.—Brisbane.** One gas-cum-oil engine-driven electricity generating plant for Charleville T.C. power house. Secretary, State Electricity Commission. B.o.T. (Ref. CRE (IB) 49673/50).*

**June 9.—Brisbane.** 33,000V underground and submarine cable, multicore underground and submarine pilot cable. Brisbane City Council Department of Electricity. B.o.T. (Ref. CRE (IB)47945/50).*

**June 13.—Wellington.** Thirteen single phase, double wound transformer units, each 9,259 kVA, 11/127 kV, 50 c/s, outdoor type, oil immersed and water cooled to form four 27,777 kVA transformer banks and spare unit for Whakamaru power station. Contract 149. State H.E. Dept., Wellington. Deposit £100; bond £4,500.

**June 27.—Wellington.** Four 3-phase 50 kV 500 MVA circuit breakers for Tavranga substation. Contract 151, New Zealand State H.E. Dept., Wellington. Deposit £100, bond £275.

**June 30.—Melbourne.** Four electric motor driven pumping units for Red Cliffs pumping station. Chief Mechanical Engineer, 31 Flinders Lane, Melbourne.

**July 12.—Sydney.** 4,000 kW rectifier units and energy dissipating resistor units for 1,500 V railway traction. Chief Electrical Engineer, Railways, 19 York Street, Sydney.

## *Your Queries — Answered*

**Vacuum chimney sweeping apparatus,** makers of? J.D. —Service Electric Co., Ltd., Secomak Works, Honeypot Lane, Stanmore; Sturtevant Eng. Co., Ltd., Southern House, Cannon St., E.C.4.; New Welbeck Ltd., 94 New Bedford Rd., Luton; British Vacuum Cleaner and Eng. Co., Ltd., Goblin Works, Leatherhead; Lamson Eng. Co. Ltd., Hythe Rd., N.W.10 (18032)

**Mercury tube sparkless switch plugs,** makers of? T.E. —Walsall Conduits Ltd., Excelsior Works, West Bromwich. (18004)

**"Aldex" fire,** makers of? T.E.—Aldergate Eng. and Construction Co., Ltd., Stoneyholme Mills, Grosvenor St., Burnley, Lancs. (18009)

**"Meco" portable blower,** makers of? T.E.—Medical Eng., Co., Ltd., 4 Fountayne Rd., N.15. (18014)

**"Venor" cloth cutting machine,** makers of? T.E.—D. Simcock and Co., Ltd., 125 Oxford Rd., Manchester 1. (18018)

**"Alpha" fire,** makers of? E.M.—These were made by the Alpha Electrical Apparatus Co., a firm which went out of business in 1935. The Piggott Electrical Co., Ltd., 3 Bridge St., Beccles, Suffolk, have been able to supply spares. (18025)

*The above are selected from questions we have answered this week. If you have a query, send it to us.*

### ANSWER WANTED

**5 amp double pole, single throw "push-push" switch,** makers of? F.H. (18037)

## CONTRACTS PLACED

**Barry T. C.** Year's supply of lamps. Ekco-Ensign Electric Ltd.

**Bradford T.C.** Re-wiring of 364 houses on Bierley housing estate. Roberts and Jowett, Ltd. £4,799.

**Burnley T.C.** Electrical installation for extension at Towneley Technical High School. S. Greenhalgh. £4,443.

**Hyde T.C.** Supply and erection of 75 Class B street lighting installations at Harbour Farm housing estate, Newton. Metropolitan Vickers Electrical Co., Ltd., £1,519; Wardle Engineering Co., Ltd., £1,528; Engineering and Lighting Equipment Co., Ltd., £1,529; N.W. Board (No. 3 sub-area), £1,676.

**PRICES OF CABLE METALS AND OTHER MATERIALS**
*(at Tuesday night)*

| | £ s. d. | New York price |
|---|---|---|
| COPPER, electrolytic | 162 0 0 | £156 0 0 |
| Delivered in 2nd and 3rd month after order | 163 10 0 | — |
| Delivered in 4th, 5th and 6th month after order | 165 0 0 | — |
| LEAD, good soft pig (foreign) | 86 0 0 | 86 0 0 |
| " " " "English" quality | 87 10 0 | — |
| Delivered in 2nd and 3rd month after order, plus | 1 0 0 | — |
| TIN (99-99.75%) (Cash) | 590-590½ | — |
| " (3 months) | 590-590½ | — |
| ALUMINIUM, commercial purity (del.) | 112 0 0 | — |
| ZINC | 95 10 0 | 88 0 0 |
| ARMOURING: | | |
| Galv. Steel Wire (0.104 in.) | 40 0 0 | — |
| Mild Steel Tape (0.04 in.) | 26 0 0 | — |

**Wednesbury T.C.** Wiring 22 bungalows and 90 houses. Midland Board, £2,292.

**Wembley T.C.** Year's supply of Atlas lamps. Thorn Electrical Industries, Ltd.

**Westminster T.C.** Installation of electric lighting in 144 flats at Norfolk, Probyn and Jessel houses. Belshaw and Co., Ltd., £2,579.

# GAZETTE ANNOUNCEMENTS

## COMPANIES ACTS

**J. D. McCarthy, Ltd.**—Mr. R. C. Methold, Liverpool Chambers, Worthing, appointed liquidator at members and creditors meeting on Apr. 13.

**Frig Spares, Ltd.**—Meeting of creditors at Winchester House, Old Broad Street, E.C.2, on May 10, at 2.30 p.m., for purposes provided for in Sections 294 and 295 of Companies Act, 1948.

**W. R. Pratt (Refrigeration), Ltd.**—Creditors to send particulars to Mr. P. L. Eynon, 30 Southampton Buildings, Chancery Lane, W.C.2, before May 5.

## BANKRUPTCY ACTS

*Receiving Order*

**Edmonton.**—J. L. Rose, electrical engineer, 9 Wades Hill, Winchmore Hill, N.21. Receiving order on debtor's petition granted Apr. 6.

*Dividends*

**Birkenhead.**—W. E. Holloway, electrical contractor, residing at "Riverview", Burton Road, Ness Holt, Wirral, and trading as Dominion Electric Heating Co. at 23 Market Street, Birkenhead. First dividend of 3s. in the £ paid on Apr. 24, at office of R. C. Johnston, 24 Fenwick Street, Liverpool 2.

**Preston.**—A. E. Howsley, residing at "Summerford", Emesgate Lane, Silverdale, Lancs, formerly in business as an electrical engineer. First dividend of 3s. 2d. per £ payable on May 5 at 47 Moseley Street, Manchester 2.

*Companies Winding-up*

**Spencer Coates and Co., Ltd.** manufacturers of electrical apparatus, Bush Lane House, Cannon Street, London E.C.1.

First meeting of creditors was held on Apr. 18 at the offices of the Board of Trade, Columbia House, Aldwych, London W.C., when Mr. J. Melville Clark, Official Receiver, reported that the winding-up order was made on Mar. 20.

The company was incorporated as a private concern on Apr. 15, 1948, with a nominal capital of £100, which was increased in May, 1948, to £10,000 and again in October, 1949, to £15,000, of which £10,650 had been issued, to carry on business as manufacturers of electrical apparatus of all kinds. A trading account showed that up to December 22, 1949, on a turnover of £3,528 the company had incurred a gross loss of £2,193 and a net loss of £15,256.

A draft statement of affairs showed gross liabilities of £11,883, of which £264 was due to fully secured creditors; £939 in respect of preferential claims; £1,000 to debenture holders; and unsecured creditors £9,680. Free assets were scheduled at £3,156 and in addition there was a sum of £264 in the hands of a partly secured creditor. The Official Receiver added that a debenture claim for £1,000 would probably rank with the unsecured creditors.

A resolution was passed for the appointment of Mr. N. W. Osborne, C.A., of 11-12 Finsbury Square, London, E.C.2, as liquidator, together with a committee of inspection.

*Voluntary Liquidation*

**Carol Manufacturing Co., Ltd.**, (electrical and radio manufacturers), 45-57 Wanstead Park Road, Ilford, Essex.

At a meeting of creditors recently held, a statement of affairs showed liabilities amounting to £6,373, of which £1,643 was due to priority creditors and £4,729 to unsecured creditors. Assets were estimated to produce £687, thus leaving a deficiency of £5,685.

The company was formed in April, 1947, with a nominal capital of £100, and accounts for the trading period to October, 1948, disclosed a loss of £700. In the following year there was a further net loss of £1,778 on a turnover of £17,203. No accounts had been prepared since October, 1949, and the present position was attributed to the fact that production never came up to expectation.

A resolution was passed confirming the voluntary liquidation of the company with Mr. A. E. Attwood, accountant, of 20-21 Lawrence Lane, London E.C.2, as liquidator, together with a committee of inspection.

# TRADE NOTES

**Copper Price.**—After we had gone to press last week the Ministry of Supply announced that the U.K. price of copper had been increased by £9 to £162 per ton, delivered, as from April 19.

**Fluorescent Tubes.**—It is reported that Duralite, Ltd., ceased production of fluorescent tubes at its Spennymoor plant earlier this month.

**H. Fisher (Oldham), Ltd.** have just completed arrangements whereby E.M.I. Suppliers, Ltd., act as their principal agents in many countries. This arrangement does not affect the agreements reached earlier with Standard Telephones and Cables, Ltd., who will represent Fishers in the South American markets, and with the Philips Electrical concern who are the Fisher agents in Norway.

Having acquired the Hopkinson motor firm, BRUSH ELECTRICAL ENGINEERING CO., LTD., announce that their existing branch offices are now responsible for the sales and service of Hopkinson's range of motors.

**Increase in Zinc Price.**—As from April 20 the price of good ordinary brand zinc was raised by £4 to £95 10s. a ton delivered.

**Lead Price.**—As from April 21 the price of good soft pig lead was raised £2 to £86 a ton delivered.

**New Address.**—The Technical Information Documents Unit of the Board of Trade will be at 40 Cadogan Square, S.W.1, as from May 1.

**Representative.**—Victor H. Iddon, Ltd., have appointed Mr. V. R. Fry as their representative for accessories and handlamps in the London area, and all districts covered by the Southern, South Eastern and Eastern Electricity Boards.

# TRADE MARKS

*This information is extracted from the Official Journal by permission of the Controller.*

**Axia Trunnion.**—B681,926. Class 11. Ventilating fans mounted on trunnions. Axia Fans Ltd., 116 Putney Bridge Road, S.W.15.

**Castra**—685,987. Class 7. Washing machines. Brown, Gibson and Jones, Canal Works, Town St., Rodley.

**Flamatrol.**—684,692. Class 17. Heat and electrically insulating materials. Fireproof Tanks Ltd., Armadores House, Bury St., London E.C.3.

**Glow-worm.**—671,628. Class 9. Electrical apparatus, weighing and measuring apparatus and instruments. — Glow-Worm Boilers Ltd., Derwent Foundry, Milford, near Derby.

**Mecol.**—674,689. Class 9. Luminous and mechanical signs 694,690. Class 11. Electric lamps and lighting fittings. Moorwood Engineering Co. Ltd., Commercial St., Nairobi, Kenya.

# BUSINESS PROSPECTS

## HOME

**Blyth T.C.** Considering erection of shops on the North Farm estate at a cost of £16,000.

**Brackley R.D.C.** Erection of 19 houses. Architects: G. Forsyth, Lawson and A. Cyril Cheek, 30 Horse Fair, Banbury, Oxon.

**Carlisle E.C.** To proceed with construction of the main building for the proposed new technical college. Architects: Buckland and Haywood, Congreve Street, Birmingham 3.

**Chesterfield R.D.C.** Erection of 12 houses on Eckington Birk Hill estate. Engineer, J. B. Wikeley, Rural Council House, Saltergate, Chesterfield.

**Colne Valley U.D.C.** Erection of 22 houses at Dirker Marsden. Architect, N. Heppenstall, 135 Armitage Road, Milnsbridge, Huddersfield.

**Crewe T.C.** Erection of 6 shops with living accommodation over on Rolls Avenue, Totty's Hall estate. Borough Engineer and Surveyor, L. Reeves, Municipal Buildings, Crewe.

**Eston U.D.C.** Erection of 38 bungalows at South Banks. N. C. Harrison, Engineer and Surveyor, Normandy Road, South Bank, Middlesbrough.

**Great Torrington T.C.** Erection of 8 houses on Town Park site. Architects: Oliver and Dyrer, Queen Anne's Chambers, Barnstaple.

**Hebburn-on-Tyne.** Plans have been prepared for branch stores in Victoria Road West for Jarrow and Hebburn Co-op. Society, Albert Road, Jarrow. C.W.S. Architects' Dept., 90 Westmorland Rd., Newcastle-on-Tyne.

**Hemel Hempstead R.D.C.** Erection of 4 blocks of Duplex flats at Havelock Rd., Kings Langley. Engineer and Surveyor, Council Offices, 2 Marlowes, Hemel Hempstead.

**Hoole U.D.C.** Erection of 24 houses at Linden Grove estate. Architect, R. Boot, 22 Newgate St., Chester.

**Lincoln C.C.** Erection of new wings for children's homes at Huntingtower Rd., Grantham. C. B. Metcalfe, County Architect, County Offices, Sleaford.

**March U.D.C.** Erection of 42 houses at Peas Hill. H. Jakens, Architect, 4 Elwyn Rd., March.

**Milford Haven U.D.C.** Erection of 36 houses at Observatory estate. Engineer and Surveyor, Town Hall, Milford Haven.

**Ongar R.D.C.** Erection of 6 houses at Pancroft estate, Abridge. Engineer and Surveyor, Bowes Field, High St., Chipping Ongar.

**Penybont R.D.C.** Erection of 86 dwellings at North Cornelly, Sarn and Pencoed. Surveyor, W. D. Davidson, Penybont Offices, Coity Rd., Bridgend.

**Portsmouth T.C.** Erection of 14 houses on Paulsgrove estate and 6 at Kingsley Rd. City Architect, 1 Western Rd., Southsea.

**Rochdale T.C.** Erection of a grammar school for boys at Balderstone. Borough Surveyor, Town Hall, Rochdale.

**Thornaby-on-Tees.** To build 74 houses at Harewood Allotments, Humphrey arable field, Foggin Lane and Andrew Lane. Borough Engineer, Town Hall.

**Tonbridge U.D.C.** Erection of 29 houses on Brook Street estate. Engineer and Surveyor, Tonbridge Castle, Tonbridge.

**Towcester R.D.C.** Erection of 14 houses. Surveyor, Geo. Berridge, Town Hall, Towcester.

**Truro T.C.** Erection of 30 houses at Malpas Rd. City Engineer and Surveyor, Town Hall, Truro.

**Wandsworth T.C.** Erection of 12 maisonettes at Chelsham Rd., Clapham, S.W.4. Town Clerk, Municipal Buildings, S.W.18.

**West Hartlepool T.C.** Recommended to spend £20,000 to £25,000 on the erection of a restaurant at the North Shelter, Seaton Carew.

**Whickham U.D.C.** Erection of 72 houses on Dunston No. 5 housing site. Surveyor, Council Offices, Whickham.

**Wokingham R.D.C.** Construction of 26 houses and 2 bungalows at School Rd., Arborfield and Newland. Architect, E. G. V. Hives, 3 Cork St., Reading.

### OVERSEAS

**Brazil.** Messrs. Anis Chenab and Cia., 833, Rua Major Facundo, Fortaleza Ceara, Brazil, wish to obtain a U.K. source of supply of electric torches of the two-element type. It is reported that the Brazilian firm have been cut off by the dollar shortage from their previous United States suppliers, and that their requirements are about 50,000 flashlights per year.

## NEW COMPANIES

*Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.*

**Baugh and Moss Ltd.,** 303 Abbey Lane, Leicester. Mech., motor, electrical and general engineers, etc. Cap.: £3,000. Dirs.: J. E. Baugh and F. W. Moss.

**Electrical Remote Control Co., Ltd.,** 15 Evanston Avenue, Hale End, E.4. Electrical and mech. engineers and contractors, etc. Cap.: £100. Dirs.: Winifred Younge and Iris Younge.

**Horton and Son (Surrey) Ltd.,** 15 Palmerston Rd., Sutton, Surrey. Wholesale distributors to the electrical radio, cycle and motor and allied trades, etc. Cap.: £1,000. Dirs.: C. W. Horton and P. M. Horton.

**Luxelectric Ltd.,** 153 Tankerville Drive, Leigh-on-Sea, Essex. Take over business of electrical apparatus manufacturers and distributors carried on at Leigh-on-Sea as "Luxelectric Developments." Cap.: £1,000. Dirs.: G. W. Luck and Marjorie A. Luck.

## MEETINGS TO NOTE

### MONDAY, MAY 1

I.E.E. (S. Midland centre).—"Some Electro-magnetic Problems." Professor G. W. O. Howe. Joint meeting with S. Midland radio group. James Watt Institute, Great Charles Street, Birmingham.—6 p.m.

### TUESDAY, MAY 2

A.S.E.E. (N.W. London branch).—Electrical Exhibition. St. Hilda's Hall, South Harrow.—8 p.m.

I.E.E. (N. Midland centre).—Annual general meeting. Yorkshire Board Offices, 1 Whitehall Road, Leeds.—6.30 p.m.

I.E.E. (N.W. centre).—Annual general meeting. "The Continental Development of Single Anode Mercury-Arc Rectifier Valves for High Power." H. von Bertele.—6.15 p.m.

I.E.E. (N. Ireland centre).—Faraday lecture, "Radar." Dr. R. A. Smith, Wellington Hall, Belfast.—7.30 p.m.

### WEDNESDAY, MAY 3

I.E.E. (Southern centre).—Annual general meeting. "Electrical Weighing." I. Dr. H. Andrews. Joint meeting with Southern branch of the Inst. Mech. Engrs.—6.30 p.m.

### THURSDAY, MAY 4

I.E.E. (Utilisation group).—"Evolution of the Lighting Art." J. W. T. Walsh, Institution, Savoy Place, W.C.2.

# Telegraph Construction & Maintenance Co. Ltd.

AT the 86th Annual General Meeting held at Winchester House, Old Broad Street, E.C.2, on April 25, 1950. During the course of his statement, the chairman, The Rt. Hon. Lord Colgrain said:

In considering the accounts for the year ended December, 1949, you will no doubt have observed that the company has had a successful year; in fact, the figures in the report show a great similarity between this year and last. The profits from the operation of associated companies are higher than last year, due to a better result from Submarine Cables Ltd.

"Revenue Reserves and Undistributed Profits" amount to £910,949, compared with £832,995 last year. This increase is mainly accounted for by the extra provision from this year's profits of £100,374, as shown in the appropriation account.

Turning to the profit and loss account, the balance of trading account £271,080 shows a decrease of £23,450 from the corresponding figure of £294,530 last year. From the directors' report it will be seen that the net profit is £140,892.

We have been successful in designing and obtaining orders for a novel cable for land communication over long distances. We have other such schemes, which we hope will bear fruit in the course of the present year.

We have had an active year in all sections, though towards the end of the year orders in our power cable department were considerably reduced. This is largely caused by lack of demand in the home market and has been aggravated because some of our export orders have been held up for currency or import permits.

The metals division has had a successful year under great difficulties due to repairs and replacement owing to war damage. A new expansion scheme is now under construction.

The high frequency cable section, though successful, has suffered from trade fluctuations, while the lack of long term extension of licences to relay companies has caused a diffidence on the part of those companies to be expansive in the implementation of their plans.

As to subsidiary and associate companies, Selborne Plantation in Malaya has had a very satisfactory year, though still suffering from the risks of banditry and general unsettlement due to the evils of Communist activity. Submarine Cables, Ltd., which is owned equally with Siemens Bros. and Co., Ltd., has had a very successful year; most of the output consisted of cable which represented capital goods for earning foreign currency, the balance being direct export, including substantial sums in dollars.

In August of this year the Science Museum is staging an exhibition in connection with the Centenary of Submarine Telegraphy, and the company proposes to make this the occasion to celebrate its participation in the manufacture of the first submarine cable laid across the Channel in 1850. This cable was made by the Gutta Percha Co., which company was, of course, the forerunner of our present company.

In conclusion, I have pleasure in again paying a very sincere tribute to the excellent work of all our employees and I offer them our grateful thanks.

The report and accounts were approved.

# Golfers! Here's your chance!

Your chance to enjoy yourself and do the Electrical Industries Benevolent Fund a good turn.

Enter for the National Golf Championship now being organised throughout the industry for the E.I.B.A.

You don't have to be a Cotton before entering, so get in touch today with the organising secretary in your area.

Don't lose any time; write or 'phone today to your Area Secretary. His name appears below.

## ADDRESSES

### LONDON & HOME COUNTIES
Mr. R. L. Packer, British Insulated Callender's Cables Limited, 21 Bloomsbury Street, London W.C.1 (Tel. MUSeum 1600).

### SOUTHERN ENGLAND
Mr. W. G. Holmes, British Insulated Callender's Cables Limited, 33 Carlton Crescent, Southampton (Tel. Southampton 2701).

### SOUTH-WESTERN ENGLAND
Mr. H. Peters, British Thomson-Houston Co. Ltd., Trinity Mews, Southernhay, Exeter (Tel. Exeter 55749).

### WESTERN ENGLAND
Mr. H. Foster, British Thomson-Houston Co. Ltd., 119 Victoria Street, Bristol (Tel. Bristol 20111).

### MIDLANDS
Mr. A. R. Leith, British Insulated Callender's Cables Limited, 9 Livery Street, Birmingham 3 (Tel. Central 6557/9).

### SOUTH-EAST MIDLANDS
Mr. D. C. Mason, W. T. Henley's Telegraph Works Co. Ltd., 31 Gwyn Street, Bedford (Tel. Bedford 3566).

### EASTERN ENGLAND
Mr. T. D. Gregory, English Electric Co. Ltd., Westminster Bank Buildings, Princes Street, Ipswich (Tel. Ipswich 4030).

## ADDRESSES

### MERSEYSIDE & NORTH WALES
Mr. S. R. Gee, W. T. Henley's Telegraph Works Co. Ltd., Henley House, 29 Hope Street, Liverpool 1 (Tel. Liverpool Royal 4137/8).

### EAST MIDLANDS
Mr. F. Bull, W. T. Henley's Telegraph Works Co. Ltd., Park House, Friar Lane, Nottingham (Tel. Nottingham 44970).

### YORKSHIRE
Mr. J. R. Bardsley, Cryselco Limited, York Place, Leeds.

### NORTHERN ENGLAND
Mr. D. Taylor, 24 Holystone Crescent, High Heaton, Newcastle-on-Tyne.

### CENTRAL & SOUTH WALES
Mr. J. M. Faulkes, W. T. Henley's Telegraph Works Co. Ltd., 5 Burt Street, Docks, Cardiff (Tel. Cardiff 2709).

### SCOTLAND EAST
Mr. J. H. Dinwoodie, British Insulated Callender's Cables Limited, 80-82 Hanover Street, Edinburgh 2 (Tel. Edinburgh 27859 and 30191).

### MANCHESTER & LANCASHIRE
Mr. W. R. Gibb, W. T. Glover & Co. Ltd., Trafford Park, Manchester 17 (Tel. Trafford Park 2141).

### NORTHERN IRELAND
Mr. V. Robinson, W. T. Henley's Telegraph Works Co. Ltd., 19 College Street, Belfast, N. Ireland (Tel. Belfast 25798).

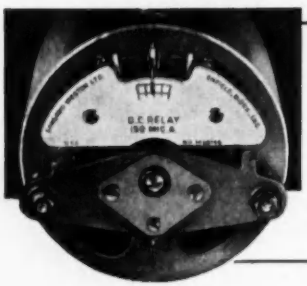
**ELECTRICAL INDUSTRIES NATIONAL GOLF CHAMPIONSHIP**

This space was donated by W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.

## FEATURES OF WESTON SUPERIORITY

# *Weston*
# MOVING COIL RELAYS

**This modern range of relays is ideal for all Laboratory or Industrial Purposes. Built on the permanent-magnet moving coil principle, unaffected by external magnetic fields, the precious metal contacts will not oxidise or tarnish, and the high torque developed ensures positive contact pressure. Supplied in Bakelite casing. Most applications call for special requirements and enquiries should therefore enclose a diagram of the circuit to be closed and state (a) High and/or low contact adjustment; (b) mounting position; (c) resistance; (d) values of current and voltage in local circuit and whether DC or AC; (e) values of resistance and any inductance or capacitance in local circuit; and (f) any special accuracy required. Every 'Weston' relay is specially designed to give the best possible performance for its individual purpose. (The Model illustrated is S54.)**




ACCURACY OF ADJUSTMENT. Special note should be made of the reduction gearing which enables the *user* to make accurate adjustment with absolute ease. The accuracy and rigidity of the mounting ensures constant centring after adjustment. Yet another special 'Weston' feature.

**SANGAMO WESTON LIMITED**

ENFIELD, MIDDLESEX: Telephone: Enfield 3434 (6 lines) & 1242 (4 lines) Telegrams: Sanwest, Enfield.

DEPOTS AT GLASGOW, NEWCASTLE-ON-TYNE, MANCHESTER AND WOLVERHAMPTON.

123

# CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

**Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia St., W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 35s. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.**

## TENDERS INVITED

### CHEADLE AND GATLEY URBAN DISTRICT COUNCIL

TENDERS—STREET LIGHTING STORES

THE Council invite Tenders for the supply of the undermentioned materials for the year ending March 31, 1951:

1. Electric Lamps for street lighting purposes.
2. Street Lighting Standards and Fittings.

Specifications and form of tender may be obtained from Mr. G. F. Stanley, engineer and surveyor, Town Hall, Bruntwood, Cheadle, Cheshire.

Tenders, in plain envelopes, duly sealed and endorsed "Tenders—Street Lighting Stores," to be delivered to the undersigned not later than 12 o'clock noon on Thursday, May 11, 1950.

The Council do not bind themselves to accept the lowest or any tender.

W. TIMPERLEY,
Clerk to the Council.

Town Hall, Bruntwood,
Cheadle, Cheshire.
April 22, 1950. (E 472)

### COUNTY BOROUGH OF BLACKPOOL

TENDERS are invited for the supply and immediate delivery of 750 yards of 0·1 sq in. 660 V, I.t. paper insulated, lead covered, double steel tape armoured 4 core cable with shaped conductors. Manufactured to B.S.S. 480/1942.

Tenders, enclosed in a plain sealed envelope endorsed "Tenders for Low Tension Cable," and not bearing any mark indicating the sender must be delivered to me at the Town Hall, Blackpool, not later than noon on Monday, May 1, 1950.

The Council do not bind themselves to accept the lowest or any tender.

TREVOR T. JONES,
Town Clerk.
(E 435)

## APPOINTMENTS VACANT

### EASTERN ELECTRICITY BOARD

*Norfolk Sub-Area*

SENIOR ENGINEERING ASSISTANT (PLANNING AND DEVELOPMENT)—SUB-AREA HEADQUARTERS

APPLICATIONS are invited from suitably qualified candidates for the appointment of Senior Engineering Assistant in the Planning and Development Section of the Norfolk Sub-Area.

The successful candidate will be responsible to the Planning and Development Engineer for the preparation of schemes and development in an area which consists of mixed urban and rural networks at voltages up to and including 33 kV. Preference will be given to applicants who have had experience in the preparation of specifications relating to overhead lines and substations.

The provisional salary for this appointment will be £600 per annum. The future salary and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidate will be required to contribute to a Superannuation Scheme and may be required to undergo a medical examination.

Applications, stating age, education, qualifications, experience and details of present appointment, should be addressed to: The Manager, Norfolk Sub-Area, Eastern Electricity Board, Duke Street, Norwich, so as to arrive not later than 14 days after the appearance of this advertisement. (E 473)

### BRITISH ELECTRICITY AUTHORITY

*East Midlands Division*

STOCKTAKER

APPLICATIONS are invited for the position of Stocktaker at this Divisional Headquarters.

The successful applicant should have first-class knowledge of electrical stores as applied to Generating Stations and Transmission Lines, and must be prepared to travel throughout the East Midlands area for the purpose of taking stock at various locations.

The position will be superannuable under the terms of the British Electricity Authority's Superannuation Scheme.

The salary will be in accordance with Grade 1 (£310-£390), or Grade 2 (£390-£450) of the National Joint Council Agreement. Appropriate travelling and subsistence allowances will be payable according to the B.E.A. Scales.

Applications must be submitted on the appropriate form which can be obtained from the Divisional Establishments Officer, at the under-mentioned address, and when completed, should be delivered not later than May 8, 1950.

W. S. BURGE,
Divisional Controller.

British Electricity House,
Barker Gate, Nottingham. (E 429)

### SOUTH EASTERN ELECTRICITY BOARD

*Guildford District*

ASSISTANT DISTRIBUTION ENGINEER

SALARY £579 per annum, rising to £609 in accordance with the N.J.B. revised schedule Class "E," Grade 7. Superannuation will be arranged. Candidates should have had experience in the design, construction, operation and maintenance of three-phase and single-phase H.V. and L.V. distribution underground and overhead systems, together with indoor and outdoor type substations, and should hold the Higher National Certificate or its equivalent in Electrical Engineering.

Applications, giving two referees, must reach W. E. Affleck, Esq., M.I.E.E., M.Inst.F., Guildford Manager, South Eastern Electricity Board, Woodbridge Road, Guildford, Surrey, by May 8, 1950.

A. L. BURNELL,
Secretary.
April, 1950. (E 475)

### SOUTHERN ELECTRICITY BOARD

*No. 2 (Newbury) Sub-Area*

APPLICATIONS are invited for the position of DISTRICT COMMERCIAL OFFICER, Melksham.

The salary for the post will be £722 per annum (Class "E," Grade 4 of Schedule A of the Revised N.J.B. Agreement).

The Melksham District of the Board is a progressive district and is responsible for the sale of just over 116 million units per annum which produces an assessment of 90 million units after devaluation for purposes of N.J.B. classification.

Candidates must have had extensive experience in the commercial side of an electricity undertaking and be conversant with tariffs, sales, commercial statistics, wiring installation, contracting and all aspects of service to both domestic and industrial consumers.

Conditions of service will be in accordance with the N.J.B. Agreement and membership of the appropriate superannuation scheme will be compulsory.

Applications, on forms to be obtained from the Secretary, Southern Electricity Board, Southern Electricity House, Bath Road, Maidenhead, should be submitted to him not later than 14 days after the appearance of this advertisement.

F. W. KEMPTON,
Secretary.
(E 457)

## NORTH WESTERN ELECTRICITY BOARD

### *No. 5 Sub-Area*

APPOINTMENT OF :

(a) ASSISTANT ENGINEERS (MAINS, PLANNING AND CONSTRUCTION)

(b) ASSISTANT ENGINEERS (OPERATION AND MAINTENANCE)

APPLICATIONS are invited for the following appointments on the staff of the Mains Engineer, No. 5 Sub-Area, The North Western Electricity Board, Blackburn :—

(a) Two Third Assistant Engineers (Mains, Planning and Construction)

Salary N.J.B. Schedule Class " H," Grade 10, i.e. £571-£584-£597 per annum.

Candidates should have had a sound training in electrical engineering and have had experience in the planning, construction and operation of industrial and rural high voltage and low voltage underground cable and overhead line networks, and sub-stations, and should be capable of estimating for and supervising the construction of such work. Construction and operating experience on 33 kV work will be an advantage.

One General Assistant Engineer (Mains, Planning and Construction)

Salary N.J.B. Schedule Class " H," Grade 13, i.e. £458-£467-£476 per annum.

Duties as above.

(b) Two Third Assistant Engineers (Operation and Maintenance)

Salary N.J.B. Schedule, Class " H," Grade 10, i.e. £571-£584-£597 per annum.

Applicants should have had a wide experience in the operation and maintenance of large industrial and rural high voltage and low voltage underground cable and overhead line networks, and sub-stations, also experience in high voltage testing and fault localising.

Operation and maintenance experience on 33 kV work will be an advantage.

One General Assistant Engineer (Operation and Maintenance)

Salary N.J.B. Schedule, Class " H," Grade 13, i.e. £458-£467-£476 per annum.

Duties as above.

Corporate or Graduate Membership of the Institution of Electrical Engineers, or exempting qualifications, will be an advantage in each case.

Applications, stating post for which application is made, also stating age, education, qualifications and experience, present position and salary, should be received by the Establishment Officer, The North Western Electricity Board, Cheetwood Road, Manchester 8, not later than Saturday, May 13, 1950. (E 461)

## BRIGHTON EDUCATION COMMITTEE

### *Brighton Technical College*

*Principal:* G. E. WATTS, M.A., Ph.D.(Cantab), F.R.I.C.

SENIOR LECTURER IN ELECTRICAL ENGINEERING with special reference to Telecommunications, required from September next mainly for advanced courses up to Honours Degree standard.

Burnham (Technical) Salary Scale for Senior Assistants (£700-£25-£800, exclusive of graduate and training additions).

Further particulars and forms of application obtainable from the undersigned, to be returned to the Principal, Technical College, Brighton 7, within 14 days.

W. G. STONE, M.A.,
Education Officer.

Education Office,
54 Old Steine, Brighton 1. (E 448)

## CITY OF MANCHESTER

### *City Architect's Department*

APPLICATIONS are invited for the following appointment on the permanent staff :—

ASSISTANT ELECTRICAL ENGINEER, A.P.T., Grade IV. Salary £480 to £525 per annum.

Candidates must be capable of preparing schemes for electric lighting and power installations in all types of municipal buildings, and must have obtained their Higher National Certificate in Electrical Engineering.

The successful candidate will be required to pass a medical examination before the appointment is confirmed, to contribute to the Corporation's Superannuation Fund, and to execute the Corporation's Deed of Service.

Applications on the official form, which can be obtained from the City Architect's Department, must be returned, together with not more than three recent testimonials to Leonard C. Howitt, B.Arch., Dip.T.P., D.P.A., F.R.I.B.A., M.T.P.I., City Architect, Town Hall, Manchester 2, by May 15, 1950, endorsed " Assistant Electrical Engineer."

The appointment is subject to the Standing Orders of the Council and the National Joint Council's Scheme of Service Conditions. Canvassing in any form is prohibited and relationship to any Members of the Council or senior official must be disclosed to me in writing.

PHILIP B. DINGLE,
Town Clerk.

Town Hall, Manchester.
April, 1950. (E 468)

## BRITISH ELECTRICITY AUTHORITY

### *Yorkshire Division*

STATION CHEMIST—MEXBOROUGH POWER STATION

APPLICATIONS are invited from suitably qualified chemists for the position of Station Chemist at the Mexborough Power Station.

The Station comprises two 30 MW generating sets and four chain grate fired boilers operating at 625 p.s.i., the make-up boiler feed water being demineralised river water.

Applicants should have had good experience of the chemical control of water treatment, plans and general analytical and testing experience related to water, fuel and oil.

The appointment will be subject to the provisions of the Authority's Superannuation Scheme.

Condition of service and salary will be in accordance with the revised N.J.B. Sch . . ade 8, Class "F," £565 per annum, which should be regarded as provisional pending agreement on the appropriate grading for Power Station Chemists.

Applications to be made on forms obtainable from the Divisional Secretary, British Electricity Authority, Yorkshire Division, British Electricity House, St. Mary's Road, Leeds 7, to whom completed forms should be returned within 14 days of the appearance of this advertisement.

Envelope to be endorsed "Station Chemist."

G. A. VOWLES,
Divisional Controller.
(E 471)

## NORTH WESTERN ELECTRICITY BOARD

### *No. 5 Sub-Area*

APPOINTMENT OF GENERAL ASSISTANT ENGINEER BUILDING AND CIVIL ENGINEERING

APPLICATIONS are invited for the above appointment on the staff of the Mains Engineer at No. 5 Sub-Area, The North Western Electricity Board, Blackburn.

Applicants should have received a recognised training and be neat and rapid draughtsmen with experience in the design and erection of commercial and industrial buildings

Experience in the preparation of estimates and specifications together with a knowledge of builders' quantities will be an advantage.

The salary will be in accordance with the N.J.B. Schedule Class " H," Grade 13, i.e. £458-£467-£476 per annum.

Applications, stating age, education, qualifications and experience, present position and salary, should be received by R. H. Harral, Esq., M.I.E.E., M.Inst.F., No. 5 Sub-Area Manager, The North Western Electricity Board, Jubilee Street, Blackburn, not later than Saturday, May 13, 1950. (E 458)

## KENT COUNTY COUNCIL

APPLICATIONS are invited for an appointment as a SENIOR ENGINEERING ASSISTANT (Electrical), in the Buildings Department, in A.P.T. Division, Grade VI (£595-£660).

The post is superannuable and the successful candidate will be required to pass a medical examination.

Applicants must be corporate members of the Institution of Electrical Engineers and be capable draughtsmen with good experience in the preparation of schemes, specifications and estimates for all classes of electrical installation work. The duties will include the preparation of drawings, inspection of premises and supervision of installations.

Applications, on forms obtainable from the County Architect, Springfield, Maidstone, must be delivered to him not later than 14 days after the appearance of this advertisement.

W. L. PLATTS,
Clerk of the County Council.

County Hall, Maidstone.
April 6, 1950. (E 396)

## SOUTHERN ELECTRICITY BOARD

### *No. 1 (Southall) Sub-Area*

ASSISTANT FOREMAN

APPLICATIONS are invited for the position of Assistant Foreman, Engineering Department, No. 1 Sub-Area, Waterloo Road, Uxbridge, Middlesex.

Applicants should possess a good experience in the erection and installation of outdoor and indoor substation plant and equipment, operated at voltages up to 33,000 V.

A knowledge of overhead lines and/or cable work and the ability to drive a vehicle would be considered an advantage.

Rate of pay and conditions of service to be governed by the N.J.I.C. Agreement, dated July 20, 1949, for the Electricity Supply Industry, the day rate for which at present is 3s. 6d. per hour.

Applications, stating age, full details of qualifications and experience should be forwarded to the Sub-Area Engineer, Southern Electricity Board, No. 1 Sub-Area, Waterloo Road, Uxbridge, Middlesex, not later than Monday, May 8, 1950, the envelope for which should be endorsed " Assistant Foreman." (E 491)

## NORTH WESTERN ELECTRICITY BOARD

*No. 5 Sub-Area*

ASSISTANT ENGINEERS (DISTRICT)

APPLICATIONS are invited for the appointment of Assistant Engineers in the following districts of the No. 5 Sub-Area at the salaries stated :—

DISTRICT

*Blackburn and Burnley*

N.J.B. SCHEDULE

Class "F," Grade 13, i.e. £405/£414/£423 per annum, or
Class "F," Grade 14, i.e. £392/£399/£406 per annum, or
Class "F," Grade 15, i.e. £375/£381/£387 per annum, according to qualifications.

The successful candidates will be required to assist in the operation, maintenance and construction of high and low voltage underground and overhead mains and substations, the location of faults and the general maintenance of supply in the district and to assist generally the district engineer.

Preference will be given to applicants who are graduate members of the Institution of Electrical Engineers, or who hold equivalent qualifications.

Applications, stating the post for which application is made, also stating age, education, qualifications and experience, present position and salary, should be received by R. H. Harral, Esq., M.I.E.E., M.Inst.F., No. 5 Sub-Area Manager, The North Western Electricity Board, Jubilee Street, Blackburn, not later than Saturday, May 13, 1950. (E 459)

## HUDDERSFIELD TECHNICAL COLLEGE

*Principal:* Dr. W. E. SCOTT, M.B.E.

APPLICATIONS are invited for the post of LECTURER IN ELECTRICAL ENGINEERING.

Applicants should possess a degree in Electrical Engineering or equivalent, and be able to teach this subject up to the standard of Higher National Certificate and Diploma. Ability to take some section of the work for the London External Degree would be an advantage.

Salary in accordance with the Burnham Scale for Further Education Establishments—viz., £300-£15-£555, with additions for recognised qualifications, industrial experience and training.

Further particulars and forms of application may be obtained from the Principal, Technical College, Queen Street South, Huddersfield, to whom the completed forms should be returned as soon as possible.

H. KAY,
Director of Education.

April 18, 1950. (E 474)

## BRITISH BROADCASTING CORPORATION

B.B.C. invites applications for the post of HEAD OF POWER SECTION, Planning and Installation Department, London. Applicants should be graduates in electrical engineering or possess equivalent qualifications and have had a sound practical training, preferably including an apprenticeship with a leading electrical manufacturer. They should have had a wide experience of a variety of electrical plant, including h.v. and l.v. switchgear and cable work; protective systems and gear; transformers, rectifiers, motors, generators, alternators of all sizes and control switchgear; and prime mover plant, including diesel engines up to 750 b.h.p. They must possess administrative experience and ability to control staff and to deal with correspondence and tenders and the operation of power supply agreements. Salary is in a grade with annual increments of £50 and a maximum salary of £1,100 per annum.—Applications, stating age, qualifications, details of past and present employment, should reach the Engineering Establishment Officer, Broadcasting House, London W.1, within 14 days of the appearance of this advertisement. (E 464)

## BRITISH ELECTRICITY AUTHORITY

*London Division*

DEPTFORD EAST GENERATING STATION

APPLICATIONS are invited for the position of BOILER HOUSE ENGINEER in charge of Boiler House shift operation.

Applicants should have received a sound engineering training and have had practical experience in the operation of boiler plant. They should also have received a sound technical training and have obtained the National or Higher National Certificate in electrical or mechanical engineering, or their equivalent.

Salary in accordance with the revised N.J.B. Schedule, Class "G," Grade 9.

Applications should be addressed to the Acting Divisional Secretary, British Electricity Authority, London Division, Ergon House, Horseferry Road, Westminster, S.W.1, to be received within fourteen days of the appearance of this advertisement.

J. N. WAITE,
Divisional Controller.

(E 476)

## BRITISH ELECTRICITY AUTHORITY

*South Wales Division*

APPLICATIONS are invited for the following appointments at Divisional Headquarters at salaries in accordance with Class "AX/CX" of the Revised National Joint Board Schedule:

(1) METALLURGIST. Grade 4 (£684-£864 per annum).

All candidates should possess a university degree and preference will be given to those who have done some research in metallurgical subjects. Consideration will be given to offering Grade 3 (£737-£921) to those also having extensive experience.

(2) COMBUSTION ENGINEER. Grade 3 (£737-£921 per annum).

Applicants should have obtained the Higher National Certificate or equivalent and have had extensive experience in the operation and efficiency control of high-pressure steam plant.

(3) STATISTICIAN AND RECORDS ENGINEER. Grade 5 (£579-£753 per annum).

Candidates should be university graduates and have specialised in statistical subjects. Some practical experience in the electricity supply industry would be an advantage.

(4) STEAM ENGINEER. Grade 3 (£737-£921 per annum).

Considerable experience of plant erection and operation essential and applicants should be corporate members of the Institution of Mechanical or Electrical Engineers.

(5) TECHNICAL ENGINEERING ASSISTANTS. Grade 3 (£737-£921 per annum).

Applicants should have had considerable experience in the design and testing of one of the following types of equipment:

(a) A.C. rotating machinery.
(b) Switchgear (from 33 kV upwards).
(c) Transformers with on load tap changing equipment.
(d) Cables (from 33 kV upwards).

In addition to their work on equipment on which they have special knowledge, the successful applicants will be expected to take part in the general technical work in the Division.

The above appointments are superannuable under the British Electricity Authority and Area Boards Scheme.

Forms of application may be obtained from the Divisional Secretary at the address below, to whom completed applications should be returned not later than May 10, 1950, in sealed envelopes endorsed with the appointment sought.

H. V. PUGH,
Divisional Controller.

Cardiff (Pengam Moors) Airport,
Cardiff.
April 19, 1950. (E 465)

## BRIGHTON EDUCATION COMMITTEE

*Brighton Technical College*

*Principal*; G. E. WATTS, M.A., Ph.D.(Cantab), F.R.I.C.

LECTURER IN ELECTRICAL INSTALLATION to undertake work for Course C Certificate of C.G.L.I. required from September next. Ability to take general electrical engineering up to ordinary National Certificate standard a recommendation.

Burnham Technical Salary Scale with increments for approved teaching and industrial experience and war service.

Further particulars and forms of application obtainable from the undersigned, to be returned to the Principal, Brighton Technical College, Brighton 7, within 14 days.

W. G. STONE, M.A.,
Education Officer.

Education Office,
54 Old Steine, Brighton 1. (E 447)

## BRITISH ELECTRICITY AUTHORITY

*East Midlands Division*

AMENDED ADVERTISEMENT

CHEMIST—NORTHAMPTON

APPLICATIONS are invited for the appointment of Chemist at the above Generating Station. The salary will be in accordance with the revised National Joint Board Schedule, Class "F," Grade 8, commencing at £565 per annum. This grade is provisional and subject to determination by the appropriate organisations.

Candidates should have had a good experience in modern power station laboratory work, covering analysis of fuel, water and oil, be thoroughly conversant with water softening and treatment, and have some knowledge of problems relating to corrosion and boiler fouling.

Conditions of service will be governed by the revised National Joint Board Agreement.

The post will be superannuable under the British Electricity Authority's Superannuation Scheme.

Forms of application may be obtained from the Divisional Establishments Officer at the under-mentioned address, and should be returned to him not later than May 8, 1950.

W. S. BURGE,
Divisional Controller.

British Electricity House,
Barker Gate, Nottingham.
April 12, 1950. (E 430)

## NORTH WESTERN ELECTRICITY BOARD

*No. 5 Sub-Area*

APPOINTMENT OF :

(a) SENIOR MAINS RECORDS ASSISTANTS
(b) MAINS RECORDS ASSISTANTS
(c) TRACERS (FEMALE)

APPLICATIONS are invited for the above appointments on the staff of the Mains Engineer at the Sub-Area and district offices.

(a) Senior Mains Records Assistants

Applicants should have had extensive experience in the measurement of underground mains and overhead line positions on site and the recording of these on the mains record plans, or experience of a similar nature. The possession of a School Certificate, although not essential, would be an advantage.

(b) Mains Records Assistants

Applicants should have had some experience of the type as for position (a) with tracing or drawing office experience, or be able to show special aptitude for this class of work. The possession of a School Certificate, although not essential, will be an advantage.

(c) Tracers (Female)

Applicants should have had tracing or drawing experience or should be able to show a special aptitude for this class of work. The possession of a School Certificate, although not essential, will be an advantage.

The salaries, which are provisional, will be as follows :—

(a) Senior Mains Records Assistants

Sub-Area Offices : Within the range of £400 to £450 per annum, with a commencing salary of £425 per annum.

Blackburn District : Within the range of £400 to £450 per annum.

Burnley District : Within the range of £400 to £450 per annum.

(b) Mains Records Assistants

Sub-Area Offices, and Blackburn, Burnley and Rossendale District Offices. In accordance with the General Clerical Grade of the National Joint Council (Administrative and Clerical Grades) for the Electricity Supply Industry Salary Grades, i.e. £173 per annum at 18 years of age, £228 per annum at 21 years of age, £310 per annum at 26 years of age, rising, subject to satisfactory service, to a maximum of £385 per annum.

(c) Tracers (Female)

Sub-Area Offices, and Blackburn, Burnley, Settle and Rossendale District Offices. In accordance with the General Clerical Grade of the National Joint Council (Administrative and Clerical Grades) for the Electricity Supply Industry Salary Grades, i.e. £108 per annum at 16 years of age, £248 per annum at 26 years of age, rising, subject to satisfactory service, to a maximum of £308 per annum.

Applications, stating post for which application is made, and whether for the Sub-Area Offices, or the Blackburn, Burnley, Settle or Rossendale District Offices, also stating age, education, experience, present position and salary, should be received by R. H. Harral, Esq., M.I.E.E., M.Inst.F., No. 5 Sub-Area Manager, The North Western Electricity Board, Jubilee Street, Blackburn, not later than Saturday, May 13, 1950. (E 460)

## BRITISH ELECTRICITY AUTHORITY

*Midlands Division*

APPLICATIONS are invited for the following positions in the Divisional Technical Engineer's Department, Birmingham:—

(a) SENIOR ASSISTANT TECHNICAL ENGINEER
(b) TWO GENERAL ASSISTANT ENGINEERS

The salary ranges for these appointments will be in accordance with Schedule C of the National Joint Board Agreement, (a) Grade 1, £884-£1,108 per annum, and (b) Grade 8, £437-£622 per annum.

Applicants for (a) should be corporate members of the Institution of Electrical Engineers or possess equivalent qualifications, and should have a sound knowledge of, and experience in, modern high voltage generation and transmission problems. Candidates should also possess specialised experience either in power system development associated with the connection of large power stations to high voltage substations and networks, or in the development and application of protective systems to modern high voltage transmission and generation systems.

Applicants for (b) should possess a university degree or Higher National Certificate in electrical engineering, and should have had some practical experience in the electrical manufacturing or supply industry. Experience either in the commissioning and maintenance testing of generating station and substation protective gear or in power system development will be considered an advantage.

Conditions of service will be in accordance with the N.J.B. Agreement, and superannuation under terms approved by the British Electricity Authority.

Applications should be made on forms which may be obtained from the Divisional Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, and be returned not later than May 20, 1950.

F. W. LAWTON,
Divisional Controller.
(E 478)

## SOUTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for positions as DEMONSTRATORS under the above Board based on the following Districts:—

| | |
|---|---|
| Swansea | Pontardawe |
| Llanelly | Pontypool |
| Abergavenny | Tredegar |
| Chepstow | Brecon |
| Llandrindod Wells | Aberdare |
| Merthyr | Pontypridd |
| Porth | Haverfordwest |

Cardigan

The duties will include the demonstration of electric cookers, washing machines, refrigerators and other electrical appliances in showrooms, consumers' homes and at public gatherings, in addition to general showroom duties.

Applicants should have received a sound training in domestic science and possession of the E.A.W. or equivalent Certificate will be an advantage.

The salary will be in accordance with Grade 1 (£310-£390) of the National Joint Council (Administrative and Clerical Grades) for the Electricity Supply Industry.

Applications, stating age, qualifications and experience, present position and salary, together with the names and addresses of three referees, should be addressed to the Secretary (Establishments Section), The South Wales Electricity Board, St. Mellons, near Cardiff, so as to reach him not later than May 6, 1950. (E 477)

## BRITISH ELECTRICITY AUTHORITY

*Yorkshire Division*

MAINTENANCE ENGINEER (MECHANICAL)
KIRKSTALL POWER STATION

APPLICATIONS are invited for the appointment of Maintenance Engineer (Mechanical) at Kirkstall Power Station.

Conditions of service and salary will be in accordance with the N.J.B. Schedule, Class "H," Grade 7, £692 to £722 per annum.

Applicants should be Corporate Members of the Institution of Mechanical Engineers or have equivalent qualifications and should have a wide experience in the maintenance of generating station power plant, and be capable of taking control of a large maintenance staff, machine shop, and supervising turbine and boiler overhauls.

The appointment will be subject to the provisions of the Authority's Superannuation Scheme.

Forms of application may be obtained from the Divisional Secretary, British Electricity Authority, Yorkshire Division, British Electricity House, St. Mary's Road, Leeds 7, to whom completed forms should be returned not later than 14 days from the appearance of this advertisement. Envelopes to be endorsed "Maintenance Engineer (Mech.)."

G. A. VOWLES,
Divisional Controller.
(E 487)

A CABLE SALES ENGINEER, with good personality and sound electrical qualifications, required immediately to supervise agencies in Far East. Youth, energy, technical ability, overseas cable sales experience, all desirable. Post will be based on Singapore. All types power and telephone cables; copper wires and strands; covered wires; cable accessories. Salary according to experience; general allowances for expenses, travel, leave; preliminary training and refresher course on full pay in London factory. Similar position also available to cover India, Pakistan, Ceylon.—Write full particulars to Managing Director, Enfield Cables Ltd., Brimsdown, Middlesex. (E 420)

A LARGE well-known Engineering Company in Yorkshire has a vacancy for a competent ELECTRICAL DESIGN ENGINEER. The successful candidate will be expected to undertake original design work on a.c. or d.c. machines up to 500 h.p. Excellent staff conditions, and a salary commensurate with duties involved.—Write, giving full particulars, quoting reference 758, to Box No. 1175, Electrical Times. (E 348)

A STAFF FOREMAN required immediately for large contract in the North. Experience all classes power and lighting installation essential; also control of labour. Good pay and prospects for right man.—Write, stating qualifications to: Box No. 1227, Electrical Times. (E 466)

APPLICATIONS are invited for the position of WINDING SHOP FOREMAN in our Electric Motor Department.—British Bronson Ltd., Stocklake, Aylesbury. (E 393)

DRAUGHTSMEN. Vacancies exist for design, senior and junior switchgear and motor control gear draughtsmen. Experience of F.L.P. an advantage. Excellent prospects for good men. South-west Scotland.—Apply, stating age, experience and salary required, to E.R.E. Newspaper House, Ayr. (E 484)

**BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2**

## CHARGE ENGINEERS

POWER STATION CHARGE ENGINEERS urgently required by major oil company for service in the Middle East. Must hold at least Higher National Certificate in Electrical Engineering and have had not less than three years' experience in the operation of large modern steam power stations with thorough knowledge of the routine operation of water-tube boilers, turbo-alternators, E.H.T. switchgear and auxiliary plant. Present position in this country should be not less than Grade 8a, Class "H" or Grade 8, Class "G" on N.J.B. Scale. Age not over 35 years. Married accommodation available. Commencing salary not less than £900 per annum, plus generous allowance in local currency. Free passages out and home; free medical attention, kit allowance, good leave arrangements. Pension scheme.

Write, giving age, personal particulars, and full details of qualifications and experience, quoting Dept. F.189 to

**Box 2550, at 191 Gresham House, E.C.2.** (E 284p)

ARMATURE WINDER required, used to all types up to 20 h.p.—Write, stating experience, wages, etc., G. Cummings, 135 Green Lane, Ilford. (E 494)

CROMPTON PARKINSON, LTD., have a vacancy for a SPECIALIST HOUSE SERVICE METER SALESMAN for Midlands, operating from Birmingham. Applicants should have first-class experience of this type of work, and have useful connections in the area. Vacancy arises as a result of promotions within the organisation.—Applications including age, education and full details of training and positions held to Ref.: J.H.F./P., Crompton House, Aldwych, London W.C.2. (E 455)

DRAUGHTSMEN required with experience in preparing diagrams of connections of switchgear and associated protective gear for large power schemes.—Apply, quoting "Switchgear," and stating age, experience and salary required, to Staff Manager, General Electric Co., Ltd. Witton, Birmingham 6. (E 495)

ELECTRICAL contractors require spare time services of COMPETENT ESTIMATOR. Terms by arrangement.—E. and G. Supplies and Services, 287 City Road, E.C.1. (E 469)

ELECTRICAL ENGINEERS required for service in Middle East. Applicants should (*a*) possess Ordinary or Higher National Certificate and have had full apprenticeship with heavy electrical equipment manufacturers or with a large colliery or allied fully electrified industry, or (*b*) possess a degree and have had two years' technical apprenticeship with similar firm to above. In each case applicants must have had at least three years subsequent experience on the installation and maintenance of heavy electrical equipment. Maximum age limit 35 years. Attractive salary, plus generous allowance in local currency, free passages out and home, free medical attention, kit allowance, good leave arrangements, pension scheme.—Write, giving personal particulars and details of qualifications and experience, quoting Dept. F.191, to Box No. 2593, at 191 Gresham House, E.C.2. (E 415)

ELECTRICAL ENGINEER required by established company in Pakistan. Age 22 to 28. Should hold good degree in technical science or electrical engineering with two years' practical experience with an approved British manufacturer. Preference given to man having experience with switchgear manufacture up to 11 kV and with switchgear estimating experience. Three years' agreement. Salary 1,100 rupees per month for first year, increasing 100 rupees per month yearly, plus allowance 250 rupees (Pakistan rupee at present worth 2s. 2d.) Provident Fund. First-class sea or air passage and six months' leave from Pakistan if re-engaged after termination of agreement. —Box No. 1241, Electrical Times. (E 493)

ENGINEER DRAUGHTSMAN wanted by consulting engineers in Westminster. Must have wide experience in the preparation of specifications and layout drawings for electrical installations in schools, hospitals, factories, office blocks.—Apply, stating age, experience, qualifications and salary required to Box No. 1207, Electrical Times. (E 409)

**FITTERS AND WINDERS experienced in large repair shop practice, wanted urgently. —Apply, in person or writing, Dowding and Mills, Ltd., Camp Hill, Bordesley, Birmingham 12.** (E 344p)

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JUNIOR DRAUGHTSMAN required for detail and assembly drawing, modifications and schedule preparation for manufacturers of electro-mechanical devices in West London area.—Write full details of experience and salary required to Box No. 1197, Electrical Times. (E 401)

LABORATORY MECHANIC required for Electrical Laboratory in South-West London for mechanical and electrical work on the construction of experimental equipment; should be able to wire from circuit diagrams. —Box No. 1193, Electrical Times. (E 388)

LADY TRACER required for engineering drawings.— Apply, stating experience, age and salary required, to Waygood-Otis, Ltd. (Admin.), Falmouth Rd., S.E.1. (E 449)

LIGHTING SALES ENGINEER required for West Country and South Wales by large electrical manufacturers. E.L.M.A. members. Must have an electrical background, preferably National Certificate. Lighting experience preferred. Car driver essential. Write giving full particulars of age, previous experience and salary required to Box No. 1205, Electrical Times. (E 408)

MIDLAND manufacturers require ADDITIONAL ENERGETIC REPRESENTATIVES for the Birmingham and district area, age 30-35. Experience of selling electric cookers, switchgear, etc., essential. Progressive position. Possession of car an advantage.—Apply, stating age, salary required, full details of electrical background, to Box No. 1223, Electrical Times. (E 462)

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SALARIED REPRESENTATIVE required with established connection London accessories buyers; some contracting experience an advantage. Commission and good prospects for able man.—State age, previous experience and basic salary required, Box No. 1211, Electrical Times. (E 418)

**BRITISH ELECTRICAL DEVELOPMENT ASSOCIATION**

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SALES REPRESENTATIVES (4); (a) Yorkshire; (b) Midlands; (c) South Wales; (d) South Coast, for well-known Electric Light Fittings Manufacturers. Progressive position for keen and energetic men with proved qualifications and connections.—Applications, stating age, experience, etc., will be treated in strict confidence, and should be addressed to Micramatic Ltd., Wootton Mount, Old Christchurch Road, Bournemouth. (E 368)

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TECHNICAL ASSISTANT for interesting work in small laboratory engaged in development of mass-produced electrical switchgear and control devices in modern West London factory. Minimum qualifications, Ordinary National. Laboratory experience essential.—Box No. 1195, Electrical Times. (E 400)

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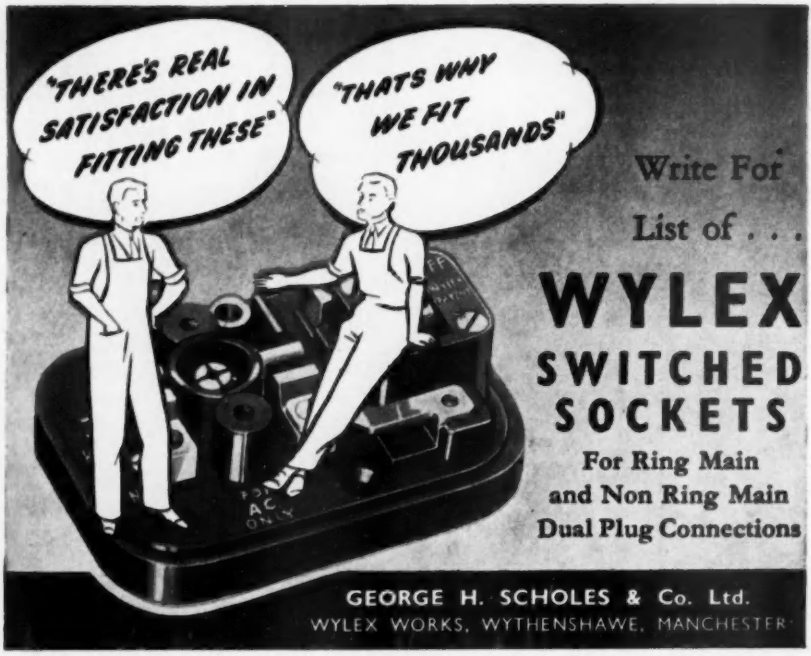


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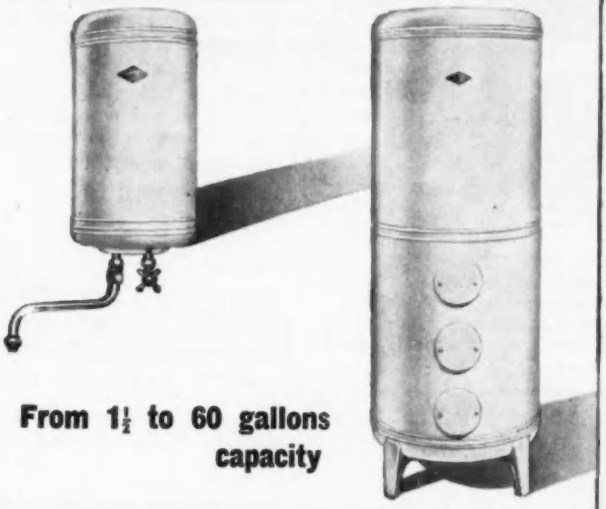

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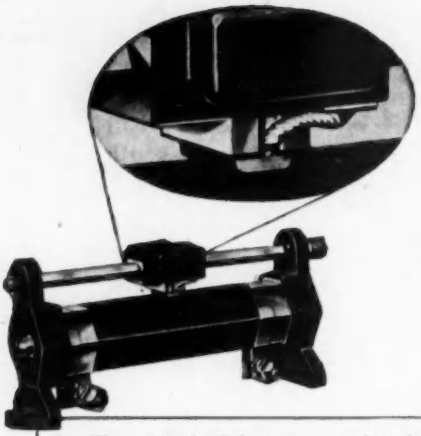

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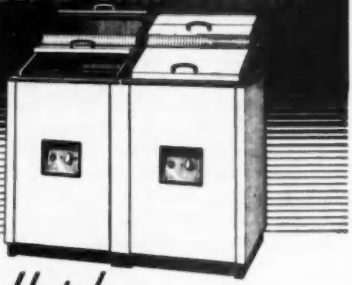

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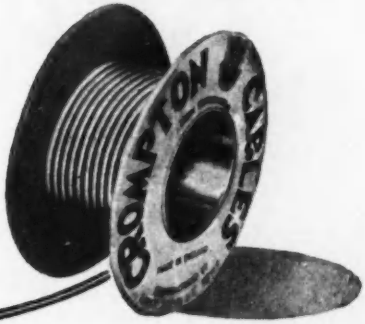


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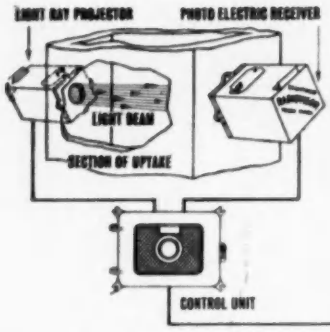


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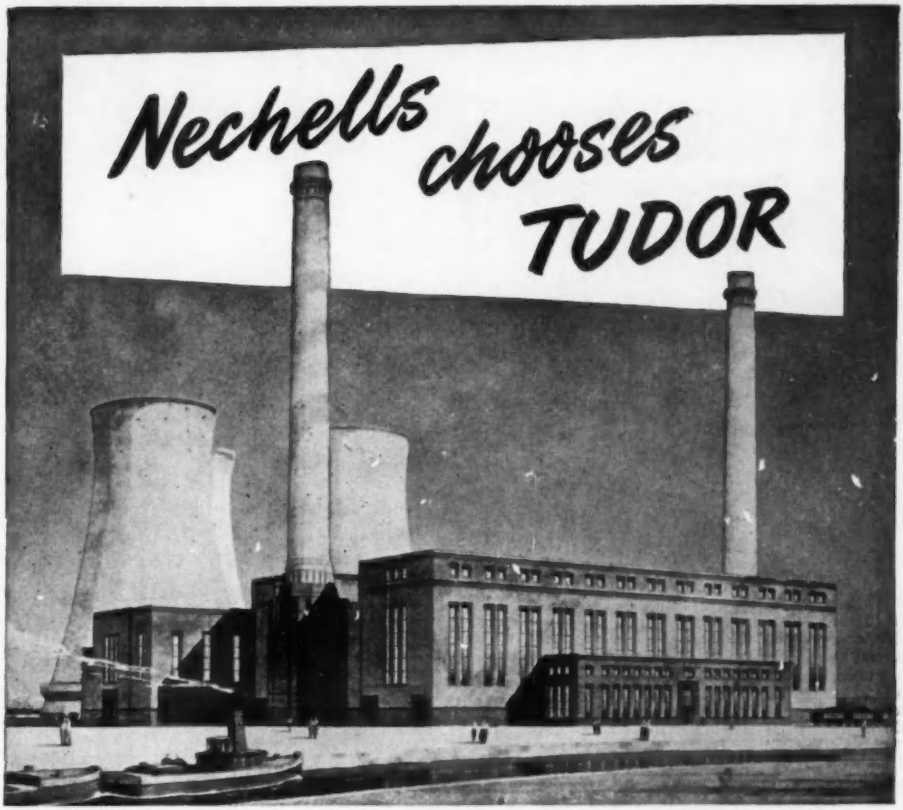


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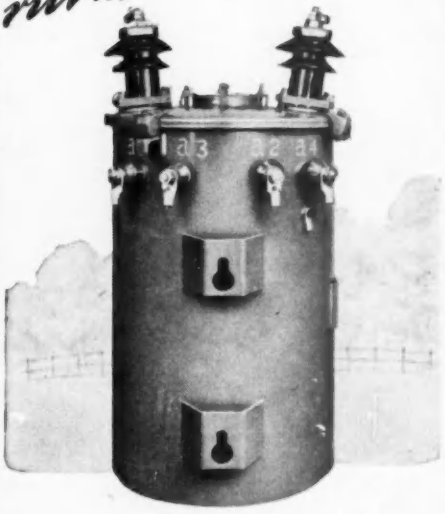

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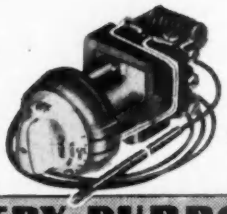

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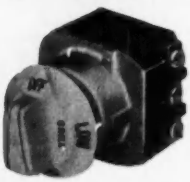

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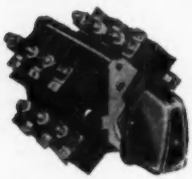

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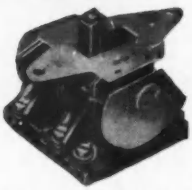

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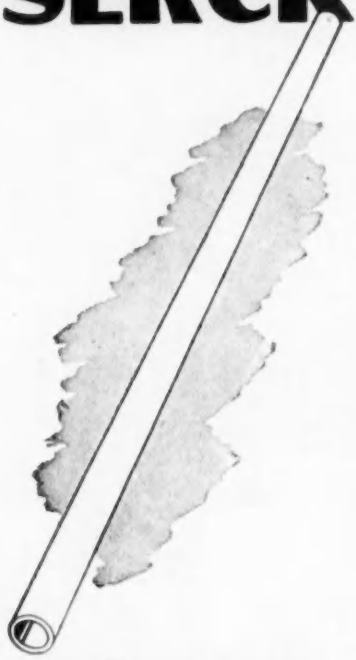

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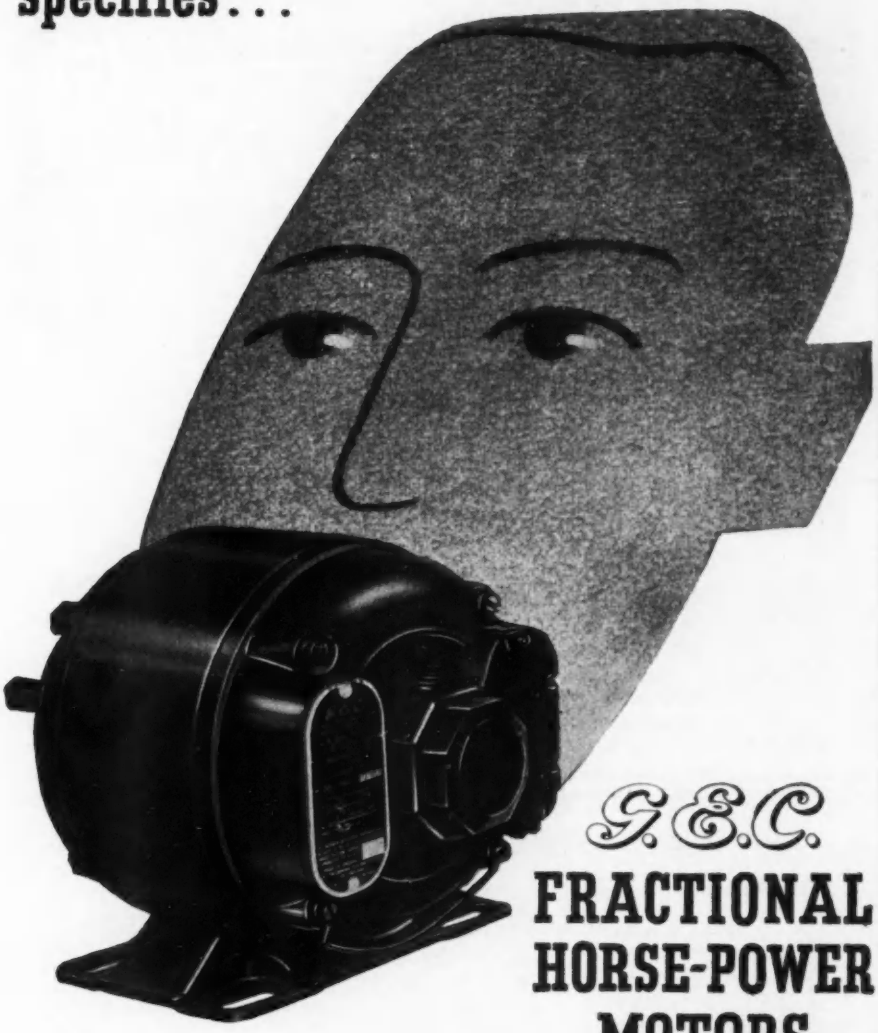

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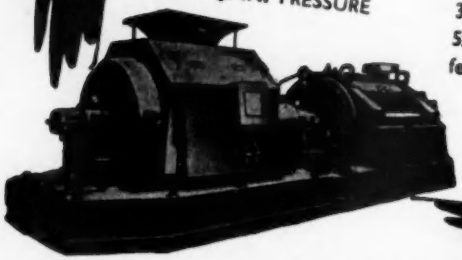

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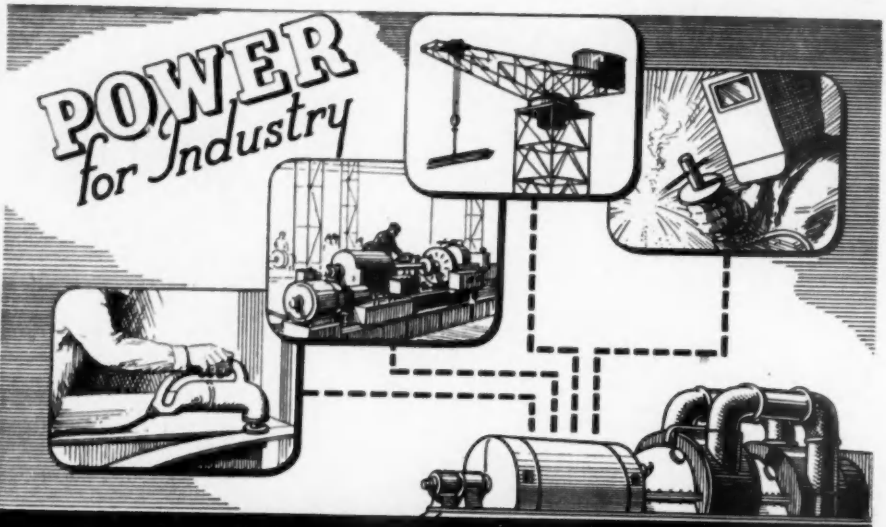


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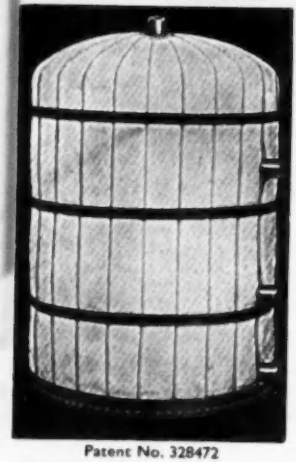

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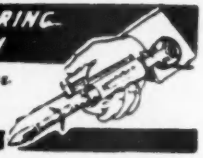

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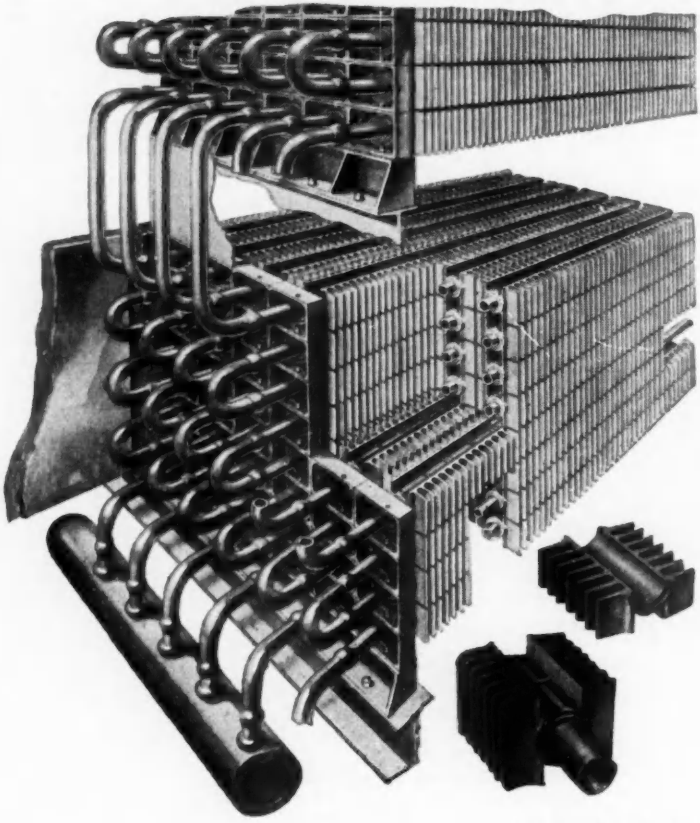
**FOR CENTRAL POWER STATIONS**



*Showing construction of Tube Elements*

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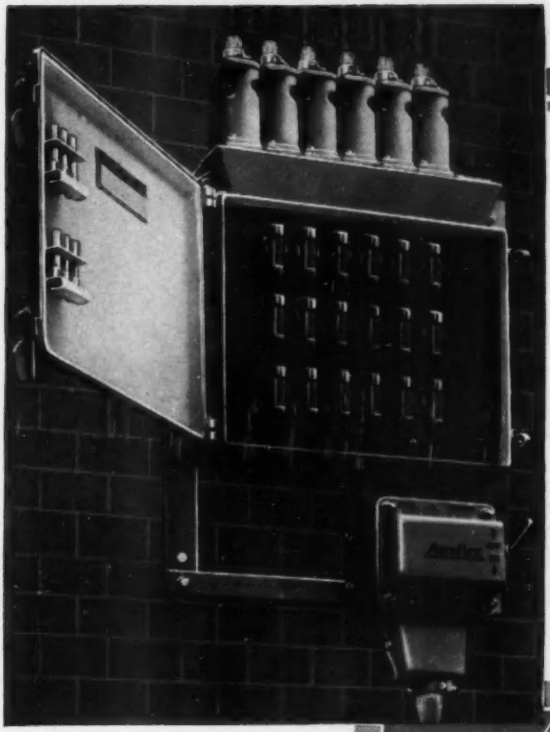
# *Ironclad*
# DISTRIBUTION FUSEBOARDS



These Multiway Fuse Boards are constructed of cast iron and are entirely suitable for arduous conditions of service ; they incorporate removable troughs or steel top and bottom plates thereby facilitating drilling and cabling.

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*List Section No. 28B fully describes these distribution boards.*

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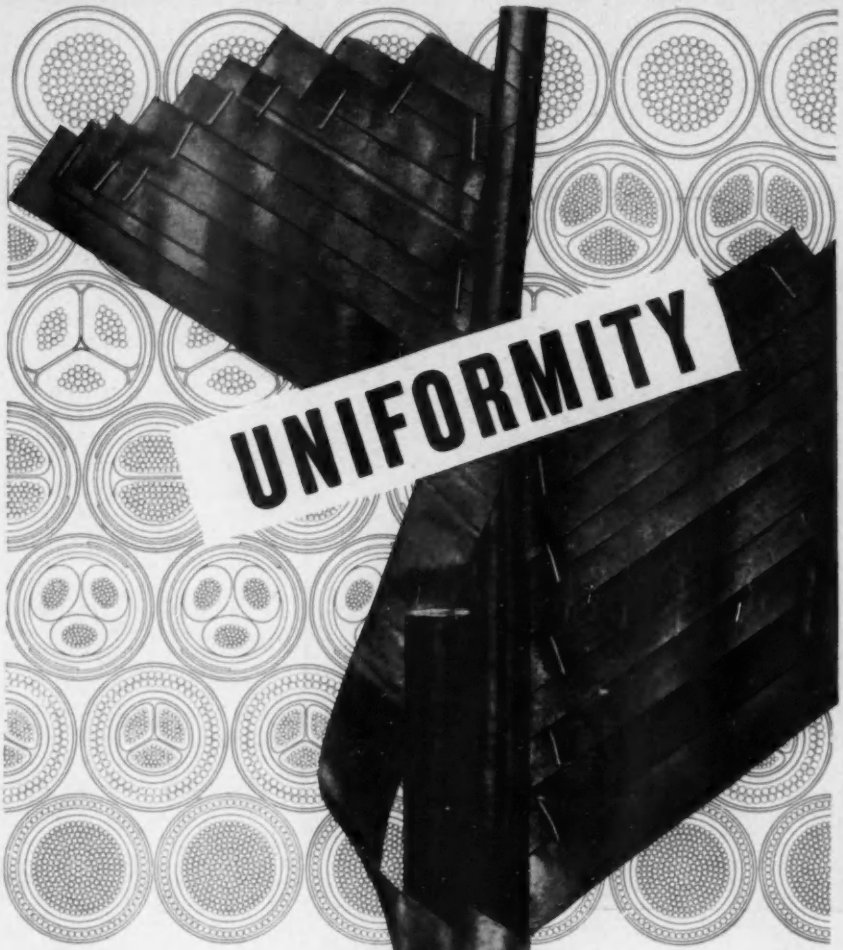


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